

AD-A105 772

NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13  
NATIONAL DAM SAFETY PROGRAM. ALTAMONT MAIN RESERVOIR DAM (INVEN--ETC(U)  
AUG 81 G KOCH

DACW51-79-C-0001

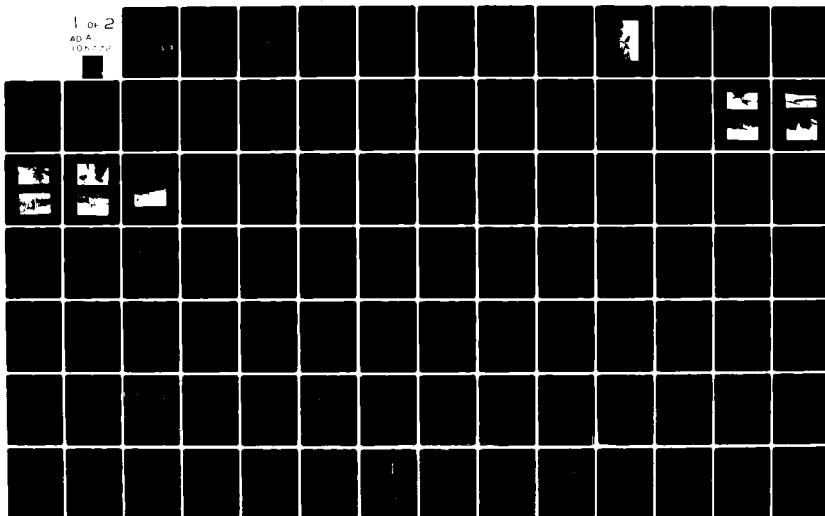
NL

UNCLASSIFIED

1 of 2

AD A

104-772



REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
	AD-A405	772
4. TITLE (and Subtitle) Phase I Inspection Report Village of Altamont Dam Lower Hudson River Basin, Albany County, N.Y. Inventory No. 126		5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program
7. AUTHOR(s) 10 GEORGE KOCH		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS New York State Department of Environmental Conservation 50 Wolf Road Albany, New York 12233		8. CONTRACT OR GRANT NUMBER(s) 15 DACW51-79-C-0001
11. CONTROLLING OFFICE NAME AND ADDRESS Department of the Army 26 Federal Plaza New York District, CofE New York, New York 10287		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 12 413
13. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza New York District, CofE New York, NY 10287		12. REPORT DATE 11 5 August 1981
		13. NUMBER OF PAGES
		14. SECURITY CLASS. (of this report) UNCLASSIFIED
		15. DECLASSIFICATION/DOWNGRADING SCHEDULE
15. DISTRIBUTION STATEMENT (of this Report)  Approved for public release; Distribution unlimited.		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) 6 National Dam Safety Program. Altamont Main Reservoir Dam (Inventory Number NY 126), Lower Hudson River Basin, Albany County, New York. Phase I Inspection Report		
18. SUPPLEMENTARY NOTES "Original contains color plates. All DTIC reproductions will be in black and white"		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Dam Safety National Dam Safety Program Visual Inspection Hydrology, Structural Stability Village of Altamont Dam Albany County Lower Hudson River Basin		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.  The examination of documents and the visual inspection of Altamont Main Reservoir Dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some problem areas which require additional studies to jointly evaluate conditions affecting the dam.		

DTIC FILE COPY

DTIC  
ELECTE  
OCT 19 1981  
S H D

393940

Using the Corps of Engineers "screening criteria" for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 24% of the PMF (Probable Maximum Flood). The spillway is, therefore, adjudged as "seriously inadequate" and the dam is assessed as unsafe, non-emergency.

The classification of "unsafe" applied to a dam because of a "seriously inadequate" spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean that there appears to be a serious deficiency in spillway capacity and if a severe storm were to occur, overtopping and failure of the dam could take place, significantly increasing the hazard to loss of life downstream of the dam.

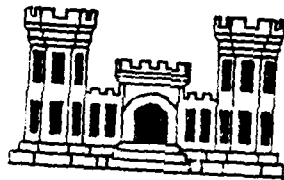
It is, therefore, recommended that within 3 months of notification to the owner, detailed hydrological hydraulic investigations of the structure should be undertaken to more accurately determine the site specific characteristics of the watershed and their affect upon the overtopping potential of the dam. The results of these investigations will determine the appropriate remedial measures which will be required to achieve a spillway capacity adequate to discharge the outflow from at least the 1/2 PMF. In the interim, a detailed emergency action plan must be developed and implemented during periods of unusually heavy precipitation. Also, around-the-clock surveillance of the structure must be provided during these periods.

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Avail and/or	
Special	

LOWER HUDSON RIVER BASIN  
ALTAMONT MAIN RESERVOIR DAM

ALBANY COUNTY, NEW YORK  
INVENTORY NO. N.Y. 126

PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM



APPROVED FOR PUBLIC RELEASE  
DISTRIBUTION UNLIMITED

NEW YORK DISTRICT CORPS OF ENGINEERS  
JANUARY, 1981

10 10 19

## PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aide in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT  
NATIONAL DAM SAFETY PROGRAM  
ALTAMONT MAIN RESERVOIR DAM  
I.D. No. NY 126

DEC # 1906-2967 LOWER HUDSON RIVER BASIN

TABLE OF CONTENTS

	<u>PAGE NO.</u>
- ASSESSMENT	-
- OVERVIEW PHOTOGRAPH	-
1 PROJECT INFORMATION	1
1.1 GENERAL	1
1.2 DESCRIPTION OF PROJECT	1
1.3 PERTINENT DATA	2
2. ENGINEERING DATA	4
2.1 GEOLOGY	4
2.2 SUBSURFACE INVESTIGATION	4
2.3 EMBANKMENT AND APPURTENANT STRUCTURES	4
2.4 CONSTRUCTION RECORDS	4
2.5 OPERATION RECORDS	4
2.6 EVALUATION OF DATA	5
3. VISUAL INSPECTION	6
3.1 FINDINGS	6
3.2 EVALUATION	7
4. OPERATION AND MAINTENANCE PROCEDURES	9
4.1 PROCEDURES	9
4.2 MAINTENANCE OF THE DAM	9
4.3 WARNING SYSTEM	9
4.4 EVALUATION	9

	<u>PAGE NO.</u>
5. HYDROLOGIC/HYDRAULIC	10
5.1 DRAINAGE AREA CHARACTERISTICS	10
5.2 ANALYSIS CRITERIA	10
5.3 SPILLWAY CAPACITY	10
5.4 RESERVOIR CAPACITY	10
5.5 FLOODS OF RECORD	10
5.6 OVERTOPPING POTENTIAL	10
5.7 EVALUATION	11
6. STRUCTURAL STABILITY	12
6.1 EVALUATION OF STRUCTURAL STABILITY	12
6.2 STRUCTURAL STABILITY ANALYSIS	12
7. ASSESSMENT/RECOMMENDATIONS	13
7.1 ASSESSMENT	13
7.2 RECOMMENDED MEASURES	13

#### APPENDIX

A. PHOTOGRAPHS	
B. VISUAL INSPECTION CHECKLIST	
C. HYDROLOGIC/ENGINEERING DATA AND COMPUTATIONS	
D. REFERENCES	
E. STABILITY ANALYSIS	
F. DRAWINGS	

Phase I Inspection Report  
National Dam Safety Program

Name of Dam: Altamont Main Reservoir Dam I.D. No. NY 126  
State Located: New York  
County: Albany  
Watershed: Lower Hudson River Basin  
Stream: Unnamed tributary of the Bozen Kill  
(trib. of Normans Kill and Lower Hudson River)  
Date of Inspection: October 24, 1980

ASSESSMENT

The examination of documents and the visual inspection of Altamont Main Reservoir Dam did not reveal conditions which constitute an immediate hazard to human life or property. However, the dam has some problem areas which require additional studies to jointly evaluate conditions affecting the dam.

Using the Corps of Engineers "screening criteria" for the initial review of spillway adequacy, it has been determined that the embankment would be overtopped for all storms in excess of 24% of the PMF (Probable Maximum Flood). The spillway is, therefore, adjudged as "seriously inadequate" and the dam is assessed as unsafe, non-emergency.

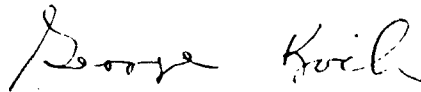
The classification of "unsafe" applied to a dam because of a "seriously inadequate" spillway is not meant to connote the same degree of emergency as would be associated with an "unsafe" classification applied for a structural deficiency. It does mean that there appears to be a serious deficiency in spillway capacity and if a severe storm were to occur, overtopping and failure of the dam could take place, significantly increasing the hazard to loss of life downstream of the dam.

It is, therefore, recommended that within 3 months of notification to the owner, detailed hydrological hydraulic investigations of the structure should be undertaken to more accurately determine the site specific characteristics of the watershed and their affect upon the overtopping potential of the dam. The results of these investigations will determine the appropriate remedial measures which will be required to achieve a spillway capacity adequate to discharge the outflow from at least the 1/2 PMF. In the interm, a detailed emergency action plan must be developed and implemented during periods of unusually heavy precipitation. Also, around-the-clock surveillance of the structure must be provided during these periods.

In addition the dam has a number of problem areas, which if left uncorrected, have the potential for the development of hazardous conditions and must be corrected within 1 year. These conditions are:

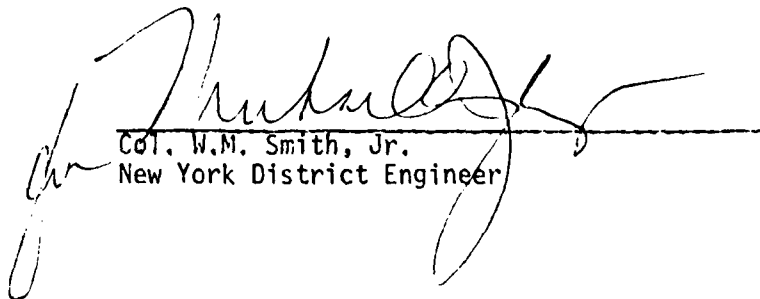


1. Repair the cracked and displaced right spillway chute wall.
2. Clean the debris and vegetation from the construction joints of the spillway, spillway chute slabs and walls, and core wall. Recaulk all joints and monitor for future deterioration.
3. Repair the cracking noted on the concrete surfaces of the core wall, spillway and buttresses, return walls, and spillway chute walls and slabs.
4. Monitor the deterioration of the gatehouse catwalk and repair as required.
5. Monitor the seepage observed at the base of the spillway chute and at the reservoir drain outlet. If seepage increases significantly, investigate and repair.
6. Remove the debris in the downstream channel.
7. Backfill the animal burrow near the crest of the embankment.
8. Remove the brush on the embankment and the downstream area beyond the toe. Provide a program of periodic cutting and mowing of the embankment surfaces.
9. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of valves. Document this information for future reference. Also periodically update the aforementioned emergency action plan for the life of the structure.



George Koch  
Chief, Dam Safety Section  
New York State Department  
of Environmental Conservation  
NY License No. 45937

Approved By:

  
Col. W.M. Smith, Jr.  
New York District Engineer

05 AUG 1981

Date:



Photo #1  
Overview of Altamont Main Reservoir

Phase I Inspection Report  
National Dam Safety Program  
Altamont Main Reservoir Dam I.D. No. NY 126  
DEC # 190B-2967 Lower Hudson River Basin  
Albany County, New York

SECTION 1: PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers, to fulfill the requirements of the National Dam Inspection Act, Public Law 92-367.

b. Purpose of Inspection

Evaluation of the existing conditions of the subject dam to identify deficiencies and hazardous conditions, determine if they constitute hazards to human life and property and recommend measures where necessary.

1.2 DESCRIPTION OF PROJECT

a. Description of Dam and Appurtenances

Altamont Main Reservoir Dam consists of 330 feet long earth embankment, with a concrete wall and sheet piling core wall and a concrete masonry cut-off-wall, and a 50 feet long ogee shaped concrete gravity spillway (right side of embankment). The maximum height of the dam is 35 feet. The dam was raised in 1961 by 8 feet. The crest width of the embankment is 12 feet. The upstream slope is approximately 1 vertical to 1.75 horizontal, ripraped in the vicinity of the 46 inch line which includes a nearly vertical concrete gravity section extending above the riprap to the crest. The downstream slope is 1:2 and is vegetated. The concrete gate house is located near the center of the embankment at the toe of upstream slope. Three 8 inch valves control the flow to the intake chamber. Two 12 inch diameter cast iron water mains extend from the gate house through the embankment to the valving system near the downstream toe of the dam. From this system an 8 inch diameter cast iron main is used to supply water to the Village of Altamont.

b. Location

The dam is located on an unnamed tributary of the Bozen Kill, a tributary of the Normans Kill and the Lower Hudson River, approximately 2.3 miles west of the Village of Altamont.

c. Size

The dam is 35 feet high and impounds 102 acre-feet at normal elevation. The dam is classified as "small" in size (less than 40 feet in height).

d. Hazard Classification

The dam is classified as high hazard due to its location above the homes along NYS Route #146.

e. Ownership

The dam is owned and operated by the Village of Altamont Altamont, NY 19009, Mr. Joseph Wilkinson (518) 861-6913.

f. Purpose of the Dam

The dam provides storage for the supply of water to the Village of Altamont.

g. Design and Construction History

The original dam was constructed about 1898 under the direction of Mr. Hiram Briggs, Altamont Village Board. The dam was raised in 1907 and a core wall was added. The files indicate an additional raising in 1933; it is unclear if this raising took place. Plans submitted in 1961 describe the raising of the dam to its current configuration. This reconstruction was designed by Robert J. Ganley, P.E. In 1966 flashboards were installed on the spillway. These boards have been replaced by 0.85 feet high logs bolted to the spillway.

h. Normal Operating Procedures

Water releases from Altamont Main Reservoir pass over the spillway and/or area discharged through the 8 inch castiron pipe to the Village of Altamont. Flow to the 8 inch pipe is controlled by 3-8 inch valves located in the gate house at the upstream toe of the dam.

1.3 PERTINENT DATA

a. Drainage Area (sq. mi.) 1.22

b. Height of Dam (ft) 35.

c. Discharge @ Dam Site (cfs.)

Spillway @ top of Dam w/flashboards	599.
Spillway @ top of Dam w/o Flashboards	987.
Reservoir Drain	35.

d. Elevations (ft., V.S.G.S.)

Top of Dam	1048.0
Top of Flashboards	1045.85
Spillway Crest	1045.0
Original Streambed	1013.0

e. Reservoir (Acres)

Surface Area Top of Dam	8.0
Surface Area Spillway Crest	6.4

f. Storage (Acre feet)

Top of Dam	127.
Spillway Crest	102.

g. Dam

Type: Earthen with sheet piling and concrete cutoff wall. Embankment raised with more earth and extended concrete core wall.

Length (ft):	330
Upstream Slope:	1.75H: 1v
Downstream Slope:	2.0H: 1v
Crest Width (ft):	12.

h. Spillway

Type: Concrete ogee, gravity section.

Weir Length (ft.): 50.

i. Reservoir Drain

Type: 12" inch cast iron from common intake with supply line.

Maximum Capacity (cfs.) 35

## SECTION 2: ENGINEERING DATA

### 2.1 GEOLOGY

The Altamont Main Reservoir Dam is located in the glaciated portion of the Appalachian Uplands (northern extreme of the Appalachian Plateau) physiographic province of New York State. These uplands were formed by the dissection of the uplifted but flat lying sandstones, limestones and shales of the Ordovician Period (435 to 500 million years ago). The plateau surface is represented by flat-topped divides with drainage generally north eastward.

Glacial cover is generally thin, the deposits of which have resulted from glaciation during the Wisconsin glaciation, approximately 11,000 years ago.

The "Preliminary Brittle Structures Map of New York" developed by Yngvar W. Isachsen and William G. McKendree (dated 1977), does not indicate the presence of any faulting or other brittle deformations within the vicinity of the dam and impoundment.

### 2.2 SUBSURFACE INVESTIGATION

No subsurface investigation could be located for the dam. The "General Soil Map of New York State" prepared by Cornell University Agriculture Experiment Station indicates that the surficial soils are the Burdett and Darien series of glacial till origin. These soils are formed on glacial till from shale and limestone, and are composed of stony silt, some clay and a trace of sand. The permeability is low and runoff is generally moderate. The depth to bedrock is variable. Bedrock was observed outcropping in the downstream channel.

### 2.3 DAM AND APPURTENANT STRUCTURES

The original dam was constructed about 1898 under the direction of Mr. Hiram Briggs, Altamont Village Board. The dam was raised in 1907, possibly in 1933-4, and in 1961. The 1961 raising to its current height was designed by Robert J. Ganley, consulting Engineering, 36 State Street Albany, NY.

The design of the structure includes a core wall and cut-off through the earth embankment consisting of concrete, sheet piling and possibly masonry construction. The design was influenced by the multiple raisings of the dam. The Ogee gravity spillway has also been raised to accomodate the increased embankment height.

### 2.4 CONSTRUCTION RECORDS

No construction records are available.

### 2.5 OPERATION RECORD

No operating records are maintained for the dam.

## 2.6 EVALUATION

The data presented in this report has been compiled from information obtained from Mr. Joseph Wilkinson, Village of Altamont and the NYS. DEC files. This information appears adequate and reliable for Phase I Inspection purposes.

## SECTION 3: VISUAL INSPECTION

### 3.1 FINDINGS

#### a. General

Visual inspection of Altamont Main Reservoir Dam and the surrounding watershed conducted on October 24, 1980. The weather was clear and the temperature ranged in the thirties. The reservoir level at the time of the inspection was 3.9 feet below the crest of the spillway (Reservoir El. 105.9).

#### b. Embankment

The earth embankment showed no signs of distress. No evidence of sloughing sliding, seepage, unusual growth or instability was observed. The crest and downstream slopes are vegetated; brush on the slope should be removed. The riprap of the upstream slope is in good condition. An animal burrow was noted on the downstream edge of the crest approximately 10 feet right of the compression building. The concrete extension of the core wall which forms the upper portion of the upstream face is cracked in several locations.

#### c. Spillway

The concrete ogee spillway located on the right side of the dam is in good condition. Seepage (less than 1 gpm) was observed at the toe of the gravity section near the 6 ft. spillway buttress. This flow appeared to be related to the deterioration of the construction joint. The joint was patched with hydraulic cement, but recaulking is required. The construction joint at the right spillway buttress is also deteriorated. The area at the toe was damp and sustaining some vegetation growth. A central vertical crack was noted in the gravity section. While no seepage was observed at the low reservoir level, the concrete was stained in the vicinity of the crack near the downstream toe. The concrete surfaces of the spillway are in good condition with little evidence of deterioration. The spillway buttresses and return walls are cracked at several locations.

The joints of the spillway chute (bottom and walls) need to be cleaned of debris and vegetation and recaulked. Minor cracks were observed in the second, third, and fourth bottom slabs from the spillway. Cracking and movement of the right spillway chute wall was observed, particularly at the third panel from the spillway, where displacement at the top of the wall was approximately 6 inches toward the spillway. This problem appears to be related to the previously high backfill behind the wall and the lack of wall weeps to release hydrostatic pressure. During this construction season a portion of the backfill was removed. Next year the installation of stiffeners should be completed. Wall weeps were observed on the left wall and no movement was apparent. The only drainage behind the right wall was at the extreme downstream end of the chute.



Seepage was observed emanating from the base of the chute over the exposed shale and sandstone bedrock at a rate of less than 1 gpm. This seepage could be related to seepage through the rock or from the deteriorated joints of the spillway and chute section.

d. Downstream Channel

The downstream channel is in good condition with only limited debris and vegetation. Boulders, observed immediately below the spillway chute, provide some energy dissipation.

e. Reservoir

While the slopes of the reservoir are steep, no significant erosion or instability problems were observed. Sediment was observed on the upper right side of the reservoir which was not excavated by dredging. This area does not appear to present any problem. A 2 inch pipe from the upper reservoir, to augment the capacity of the main reservoir, discharges near the right spillway buttress.

f. Gate House and Water Supply System

A gate house located near the midpoint of the embankment at the toe of the upstream slope controls the flow of water to the Village of Altamont. The gate house is connected to the embankment by a concrete catwalk. The concrete of the catwalk has deteriorated to the point where steel beams have been used to stiffen the walk. The water in the reservoir may be discharged through 3-8 inch valves into 2-18 inch cast iron pipes which extend beneath the embankment to the control building near the toe of the downstream slope. From the toe of the dam, an 8 inch pipe extends from the 12 inch pipe and supplies water to the Village.

The 12 inch pipe on the right side of the gate house serves as a reservoir drain, which outlets into a channel below the control building. Seepage in this channel from the drain is estimated to be less than 2gpm. Valving in the vicinity of the control building provides pressure reduction of the supply line and additional control for the 8 inch pipes.

3.2 EVALUATION OF OBSERVATIONS

The problem areas observed during the inspections and the recommended remedial actions are as follows:

1. Cracking and movement of the right spillway chute wall was observed. Removal of backfill, installation of weeps and stiffening of the wall should control this problem;
2. Seepage was observed resulting from deterioration of the construction joints and cracking of the spillway concrete. Vegetation was also noted growing in the joints of the spillway chute slabs. All construction joints require cleaning and recaulking to reduce seepage and inhibit infiltration through the spillway chute and core wall.
3. Cracking of the exposed core wall, spillway buttresses, return walls and spillway chute slabs were observed. These areas require repair.

4. Monitor the deterioration of the catwalk and repair as required, .
5. Monitor the seepage observed at the base of the spillway chute and at the reservoir drain outlet. If seepage increases significantly, investigate and repair.
6. Periodically remove the debris in the downstream channel.
7. Backfill the animal burrow noted near the crest of the embankment.
8. Remove the brush on the embankment and the downstream area beyond the toe.
9. Provide a program of periodic cutting and mowing of the embankment surfaces. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of all valves. Document this information for future references. Also develop an emergency action plan for the notification of downstream residents and the proper governmental authorities.

## SECTION 4: OPERATION AND MAINTENANCE PROCEDURES

### 4.1 PROCEDURES

The normal water surface is approximated by the spillway crest (E1 109.8). The 3-8 inch diameter valves within the gate house are operated to provide releases to the 12 inch 8 reservoir drain and the 8 and 12 inch line which supplies water to the Village of Altamont.

### 4.2 MAINTENANCE OF THE DAM

Maintenance of the dam is provided by the owner, the Village of Altamont, NY. Maintenance of the dam is considered unsatisfactory as evidenced by the cracking of concrete elements and deteriorating joints, vegetation on the downstream slope, and animal burrow.

### 4.3 WARNING SYSTEM

There is no warning system in effect or in preparation.

### 4.4 EVALUATION

The dam and appurtenances have not been maintained in satisfactory condition as noted in "Section 3: Visual Inspection".

## SECTION 5: HYDRAULICS/HYDROLOGY

### 5.1 DRAINAGE AREA CHARACTERISTICS

The Altamont Main Reservoir is located on an unnamed tributary of the Bozen Kill, which is tributary to the Norman's Kill and the Lower Hudson River. The dam is approximately 2.3 miles west of the village of Altamont. The total area of the watershed at the main reservoir is 1.22 square miles. The drainage area is split by an upper reservoir which has a watershed area of 0.73 square miles. The terrain is moderately steep with well defined drainage paths. The area is heavily wooded and virtually undeveloped.

### 5.2 ANALYSIS CRITERIA

The analysis of the spillway capacity of the dam and storage of the reservoir was performed using the Corps of Engineers HEC-1 computer model. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph method, and the Modified Puls routing procedure was incorporated. The Probable Maximum Precipitation (PMP) was 19.3 inches (24 hrs., 200 sq. miles) from Hydrometeorological Report #33 in accordance with recommended guidelines of the Corps of Engineers. Several floods (%s of the Probable Maximum Flood) were selected for analysis. The full PMF inflow of 2536 cfs was routed through the reservoir with no significant attenuation in outflow due to the lack of volume of the reservoir.

### 5.3 SPILLWAY CAPACITY

The spillway is a 50 feet long concrete ogee section with flashboards that are 0.85 feet high. For this analysis it was assumed that the flashboards would not fail. The crest elevation is 1045.0, top of flashboards are 1045.85, and top of dam is 1048.0. The maximum capacity of the spillway assuming no flashboard failure is 599 cfs.

### 5.4 RESERVOIR CAPACITY

The reservoir capacities at the crest of the spillway, and at the top of the dam are 102. and 127. acre feet respectively. Surcharge storage between spillway and top of dam is equivalent to a 0.38 inches of runoff from the watershed area.

### 5.5 FLOODS OF RECORD

There are no gaging stations located on or near the dam site nor are there any accounts of high flows or levels.

### 5.6 OVERTOPPING POTENTIAL

The maximum capacity of the spillway before overtopping occurs is 599 cfs, which is 24% of the PMF inflow of 2536 cfs. The dam is overtopped by 0.6 feet during the  $\frac{1}{2}$ PMF event of 1271 cfs inflow. The full PMF event of 2536 cfs inflow overtops the dam by 1.2 feet.

#### 5.7 EVALUATION

The spillway of the Altamont Main Reservoir will only discharge 24% of the Probable Maximum Flood. Based on the Corps of Engineers Screening Criteria, it is considered "seriously inadequate". The dam is, therefore, considered as unsafe, non emergency.

## SECTION 6: STRUCTURAL STABILITY

### 6.1 EVALUATION OF STRUCTURAL STABILITY

#### a. Visual Observations

No signs of major distress were observed in connection with the earth embankment or spillway. There are a number of problem areas, discussed in Section 3: "Visual Inspection", which if left uncorrected have the potential for the development of hazardous conditions.

#### b. Design and Construction Data

No design or construction data could be located concerning the structure stability of the embankment or spillway section.

#### c. Post Construction Changes

The original dam was constructed about 1898, raised in 1907, possibly in 1933 and again in 1961 to its present configuration. The last raising was designed by Robert J. Ganley, Consulting Engineer.

### 6.2 STRUCTURAL STABILITY ANALYSIS

A structural stability analysis was conducted for the spillway portion of the dam. The results of the analysis are as follows:

#### Case      Description of loading Conduits

- |   |  |
|---|--|
| 1 | Normal Operating conditions. Reservoir at El 109.8 full uplift, no tailwater.                                  |
| 2 | Normal Operating conditions, with 7.5 kips/1.f ice load at El 108.3  |
| 3 | Water at 1/2 PMF level (el. 113.3) uplift as in Case 1 neglecting weight of water on dam tailwater = 1.2 foot. |
| 4 | Water of PMF level (El. 114.0) uplift as in Case 3, tailwater = 1.4 feet                                       |
| 5 | Normal Operating Conditions as in Case 1, with seismic forces $c_t = 0.1$ .                                    |

Case	Factor of Safety Overtuning	Location of Resultant From toe	Factor of Safety Sliding
1	5.15	6.7	5.26
2	2.46	4.8	2.32
3	4.01	6.3	3.46
4	3.85	6.2	3.25
5	4.94	6.6	2.75

Location of middle 1/3: 4.3' to 8.7' from toe

These results indicate that the structure has factors of safety in excess of those recommended by the Corps of Engineers. No further analysis is required at this time. Additional information concerning this analysis is included in Appendix E.

## SECTION 7: ASSESSMENT /RECOMMENDATIONS

### 7.1 ASSESSMENT

#### a. Safety

The Phase I Inspection of Altamont Main Reservoir Dam revealed that the spillway is "seriously inadequate" based on the Corps of Engineers "Screening Criteria" and outflows from any storm in excess of 24% of the PMF will overtop the dam. This overtopping of the dam would cause breaching of the embankment and the resulting flood-wave would significantly increase the hazard to downstream residents. For these reasons, the dam has been assessed as unsafe, non-emergency.

#### b. Adequacy of Information

The information reviewed is considered adequate for Phase I Inspection purposes.

#### c. Need for Additional Investigations

Since the spillway is considered "seriously inadequate" additional hydrologic/hydraulic investigations are required to more accurately determine the site specific characteristics of the watershed. After these investigations have been completed, remedial measures must be initiated so that the spillway can safely discharge the outflow from the 1/2 PMF event without overtopping of the dam.

#### d. Urgency

The additional hydrologic/hydraulic investigations must be initiated within 3 months from the date of notification, completed within 1 year and remedial measures as a result of these investigations completed within 2 years from the date of notification. In the interim develop an emergency action plan for notification of downstream residents and the proper governmental authorities, and provide around-the-clock surveillance of the dam during periods of unusually heavy run-off. The other problem areas listed below must be corrected within 1 year from notification.

### 7.2 RECOMMENDED MEASURES

1. The results of the hydrologic/hydraulic investigations will determine the appropriate remedial actions required.
2. Repair the cracked and displaced right spillway chute wall.
3. All construction joints of the spillway, spillway chute slabs and walls and core wall require cleaning of debris and vegetation, and recaulking. Periodically monitor all joints and recaulk as necessary in the future.
4. Repair the cracking noted on the concrete surfaces of the core wall, spillway, and buttresses, return walls and spillway chute slabs and walls.
5. Monitor the deterioration of the gate house catwalk and repair as required.
6. Monitor the seepage observed at the base of the spillway chute and at the reservoir drain outlet. If seepage increases significantly, investigate and repair.

7. Remove the debris in the downstream channel.
8. Backfill the animal burrow noted near the crest of the embankment.
9. Remove the brush on the embankment and the downstream area beyond the toe. Provide a program of periodic cutting and mowing of the embankment surfaces.
10. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of all valves. Document this information for future reference. Also periodically update the aforementioned emergency action plan for the structure.



APPENDIX A  
PHOTOGRAPHS



Photo #2  
View of embankment and gate house.



Photo #3  
View from Right abutment of downstream slope.



Photo #4  
View of Reservoir

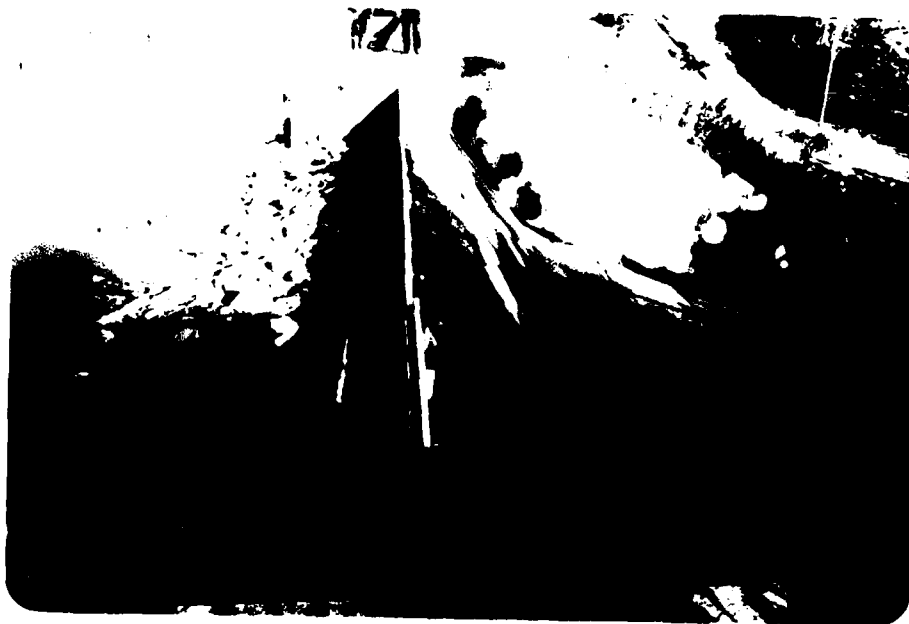


Photo #5  
View of Spillway crest with flashboards.



Photo #6  
View of Spillway channel.  
Note displacement of right wall and  
seepage along left channel construction joint.



Photo #7  
View of displacement of right spillway wall.



Photo #8  
View of seepage exiting at base of  
ogee section, left side.



Photo #9  
View of transition to natural channel from the spillway.

Photo #10  
View of downstream channel.



APPENDIX B  
VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST1) Basic Data

## a. General

Name of Dam ALTAMONT MAIN ReservoirFed. I.D. # NY 126 DEC Dam No. 190B-2967River Basin Lower HudsonLocation: Town Knox County ALBANYStream Name Undamed trib. to the Bozen Kill

Tributary of \_\_\_\_\_

Latitude (N) 42° 41.6' Longitude (W) 74° 09.6'Type of Dam earth embankment w/ concrete cutoffHazard Category C - highDate(s) of Inspection Oct. 24, 1980Weather Conditions clear, 30'sReservoir Level at Time of Inspection 3.9 feet below spillwayb. Inspection Personnel J.C. Vatch, R. M. Lacey, R. Duerin.

c. Persons Contacted (Including Address &amp; Phone No.) \_\_\_\_\_

Mr. Joe WilkinsonVillage of AltamontNY 19009(518) 861-6913

## d. History:

Date Constructed 1898 Date(s) Reconstructed 19071961Designer Robert GAWLEY, P.E. (latest reconstruct.)Constructed By ?Owner Village of Altamont.



2) Embankment

## a. Characteristics

- (1) Embankment Material earth
- (2) Cutoff Type concrete
- (3) Impervious Core concrete
- (4) Internal Drainage System \_\_\_\_\_
- (5) Miscellaneous \_\_\_\_\_

## b. Crest

- (1) Vertical Alignment good
- (2) Horizontal Alignment good
- (3) Surface Cracks none evident
- (4) Miscellaneous some depressions, animal burrow

## c. Upstream Slope

- (1) Slope (Estimate) (V:H) 1 : 1.75
- (2) Undesirable Growth or Debris, Animal Burrows Some
- (3) Sloughing, Subsidence or Depressions - few small

(4) Slope Protection rip-rap in place

(5) Surface Cracks or Movement at Toe none

d. Downstream Slope

(1) Slope (Estimate - V:H) 1:2.0

(2) Undesirable Growth or Debris, Animal Burrows some brush

(3) Sloughing, Subsidence or Depressions some small

(4) Surface Cracks or Movement at Toe none

(5) Seepage none

(6) External Drainage System (Ditches, Trenches; Blanket) drainage ditch should be cleared of brush & debris

(7) Condition Around Outlet Structure vegetated - brush & other growth should be cleared

(8) Seepage Beyond Toe none apparent

e. Abutments - Embankment Contact

good.

(1) Erosion at Contact none

(2) Seepage Along Contact none

3) Drainage System

a. Description of System ~~no~~ ditches etc

b. Condition of System good - minor maintenance

c. Discharge from Drainage System None apparent

4) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.) none

5) Reservoir

- a. Slopes flat - stable
- b. Sedimentation some
- c. Unusual Conditions Which Affect Dam none

6) Area Downstream of Dam

- a. Downstream Hazard (No. of Homes, Highways, etc.) few homes & highway
- b. Seepage, Unusual Growth only @ end of spillway chute
- c. Evidence of Movement Beyond Toe of Dam none
- d. Condition of Downstream Channel heavy growth, large rocks

7) Spillway(s) (Including Discharge Conveyance Channel)

- construction joints need work
- differential movement of right wall.
- a. General some cracking
- b. Condition of Service Spillway fair. maintenance needed repair wall.

c. Condition of Auxiliary Spillway none

d. Condition of Discharge Conveyance Channel should be cleared

8) Reservoir Drain/Outlet

Type: Pipe ☒ Conduit \_\_\_\_\_ Other \_\_\_\_\_

Material: Concrete \_\_\_\_\_ Metal ☒ Other \_\_\_\_\_

Size: 12" Length \_\_\_\_\_

Invert Elevations: Entrance \_\_\_\_\_ Exit \_\_\_\_\_

Physical Condition (Describe): \_\_\_\_\_ Unobservable \_\_\_\_\_

Material: \_\_\_\_\_

Joints: \_\_\_\_\_ Alignment \_\_\_\_\_

Structural Integrity: \_\_\_\_\_

Hydraulic Capability: \_\_\_\_\_

Means of Control: Gate \_\_\_\_\_ Valve ☒ Uncontrolled \_\_\_\_\_

Operation: Operable ☒ Inoperable \_\_\_\_\_ Other \_\_\_\_\_

Present Condition (Describe): operated yearly

9) Structural

- a. Concrete Surfaces Spillway cracked- displaced wall  
caulking in joints in need of repairs
- b. Structural Cracking some some surficial
- c. Movement - Horizontal & Vertical Alignment (Settlement) Spilling  
wall.
- d. Junctions with Abutments or Embankments good some backfilling  
necessary
- e. Drains - Foundation, Joint, Face good shape - minor repair  
needed on gatehouse door.
- f. Water Passages, Conduits, Sluices
- g. Seepage or Leakage some seepage at base of spillway

- h. Joints - Construction, etc. caulking
- i. Foundation
- j. Abutments right abutment removed to reduce pressure on spillway wall, to be repaired & backfilled
- k. Control Gates
- l. Approach & Outlet Channels good
- m. Energy Dissipators (Plunge Pool, etc.) natural - clear outlet structure & channel of brush
- n. Intake Structures good
- o. Stability no movement
- p. Miscellaneous —

10) Appurtenant Structures (Power House, Lock, Gatehouse, Other)a. Description and Condition good - door tobe fixed11) Operation Procedures (Lake Level Regulation):



APPENDIX C  
HYDROLOGIC/HYDRAULIC  
ENGINEERING DATA AND COMPUTATIONS

CHECK LIST FOR DAMS  
HYDROLOGIC AND HYDRAULIC  
ENGINEERING DATA

1

AREA-CAPACITY DATA:

	<u>Elevation</u> (ft.)	<u>Surface Area</u> (acres)	<u>Storage Capacity</u> (acre-ft.)
1) Top of Dam	<u>1048.</u>	<u>8.0</u>	<u>127.</u>
2) Design High Water (Max. Design Pool)	<u>—</u>	<u>—</u>	<u>—</u>
3) Auxiliary Spillway Crest	<u>—</u>	<u>—</u>	<u>—</u>
4) Pool Level with Flashboards	<u>1045.85</u>	<u>6.8</u>	<u>102.</u>
5) Service Spillway Crest	<u>1045.0</u>	<u>6.4</u>	<u>~95.</u>

DISCHARGES

	<u>Volume</u> (cfs)
1) Average Daily	<u>1-2.</u>
2) Spillway @ Maximum High Water T. of Dam.	<u>599.</u>
3) Spillway @ Design High Water	<u>—</u>
4) Spillway @ Auxiliary Spillway Crest Elevation	<u>—</u>
5) Low Level Outlet	<u>35.</u>
6) Total (of all facilities) @ Maximum High Water	<u>639.</u>
7) Maximum Known Flood	<u>—</u>
8) At Time of Inspection	<u>—</u>

## CREST:

ELEVATION: 1098.0Type: earth with concrete core wallWidth: 12' Length: 330'Spillover concrete ogeeLocation right side of embankment

## SPILLWAY:

## SERVICE

## AUXILIARY

1045.0

Elevation

concrete ogee

Type

50'

Width

Type of Control

Uncontrolled

Controlled:

flashboards 0.85'Type  
(Flashboards; gate)

Number

Size/Length

Invert Material

Anticipated Length  
of operating service150'

Chute Length

2H:1V slope.Height Between Spillway Crest  
& Approach Channel Invert  
(Weir Flow)

## HYDROMETEROLOGICAL GAGES:

Type : \_\_\_\_\_

Location: \_\_\_\_\_

Records:

Date - \_\_\_\_\_

Max. Reading - \_\_\_\_\_

## FLOOD WATER CONTROL SYSTEM:

Warning System: None

Method of Controlled Releases (mechanisms):

8" water supply line12" res. drain.

DRAINAGE AREA: 1.22 mi<sup>2</sup>

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: heavily wooded, undeveloped.

Terrain - Relief: moderately steep

Surface - Soil: low perm. some bedrock.

Runoff Potential (existing or planned extensive alterations to existing  
(surface or subsurface conditions)

none planned.

Potential Sedimentation problem areas (natural or man-made; present or future)

none

Potential Backwater problem areas for levels at maximum storage capacity  
including surcharge storage:

none

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the  
Reservoir perimeter:

Location: none

Elevation: \_\_\_\_\_

Reservoir:

Length @ Maximum Pool 800' ~~(Miles)~~

Length of Shoreline (@ Spillway Crest) 1600' (Miles)

# Altamont Reservoir

DA:

$$\text{MAIN RESERVOIR: } 3.39'' \left( \frac{24000^2}{14.1 (43560) (570)} \right) = .486 \text{ mi.}^2$$

$$\text{UPPER RESERVOIR: } 5.10'' \left( \frac{24000^2}{14.1 (43560) (640)} \right) = .732 \text{ mi.}^2$$

$$1.22 \text{ mi.}^2$$

DISTANCE BETWEEN RESERVOIRS  $\approx 2300'$

$$\text{SLOPE: } \frac{1190 - 1045}{2300} = .06$$

$$V \approx 4.6 \text{ fps.}$$

$$T = \frac{d}{V} = \frac{2300}{5} \text{ s} = 7.6 \text{ min.}$$

high flows considered  $< T$ , assume time difference negligible combine hydrographs w/ lag. @ MAIN. RES.

UPPER RES.

$$L = 3.3'' \left( \frac{24000}{12(5280)} \right) = 1.25 \text{ mi.}$$

$$L_{ca} = 1.5'' \left( \frac{24000}{12(5280)} \right) = 0.57 \text{ mi.}$$

$$S = \frac{150 - 1150}{1.25(5280)} = \frac{320}{6600} = .05$$

$$C_t = 2.0 \text{ (possibly lower due to steepness)}$$

$$t_p = C_t (L + L_{ca})^{0.3} = 1.8 \text{ hr.}$$

$$t_r = \frac{1.8}{5.5} = .33 \text{ hr.} = 20 \text{ MIN.}$$

$$T_p = t_p + 0.5 t_r = 1.97 \text{ hr.}$$

RESERVOIR CAPACITY

CREST SPILLWAY ELEVATION 1190.

<u>EL.</u>	<u>CAPACITY (GAL <math>\times 10^6</math>)</u>	<u>(ACRE-FT.)</u>
1191	11.2	34.4
90	9.3	28.5
53	6.0	18.4

(2)

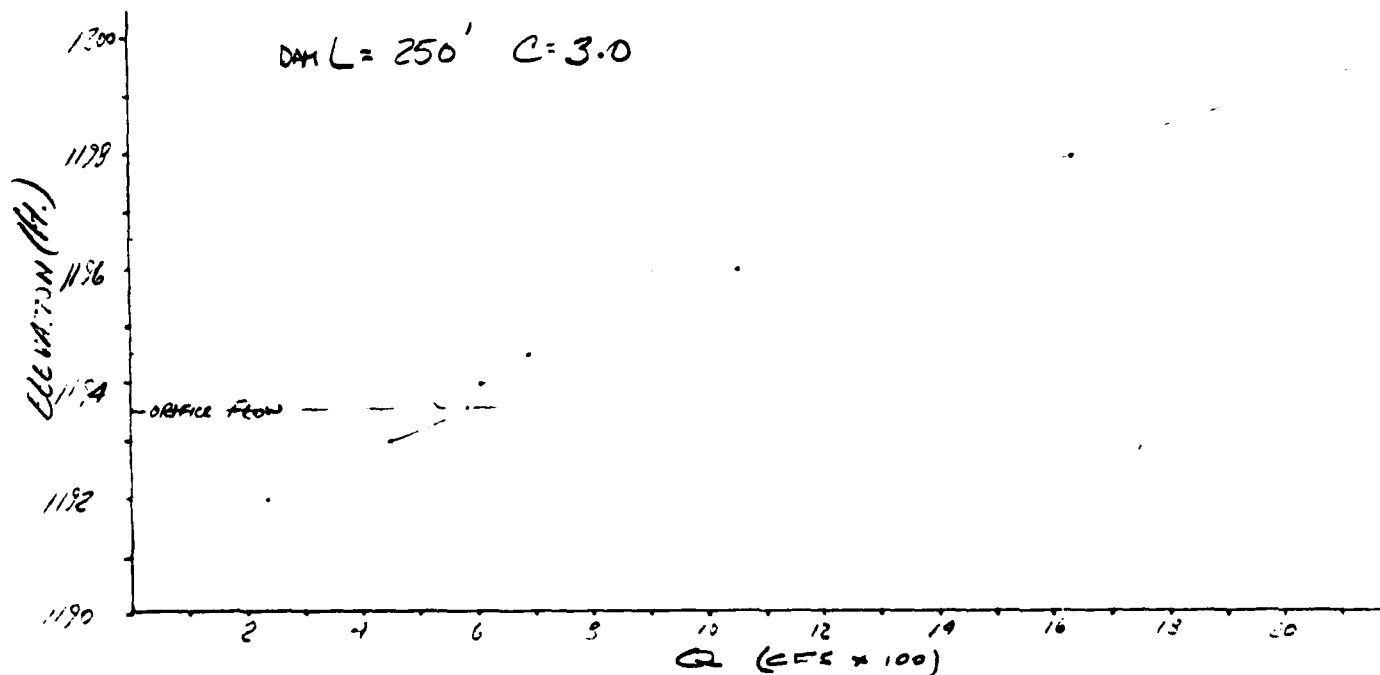
<u>EL.</u>	<u>CA<sup>2</sup></u>	<u>(ACRE FT.)</u>
1186	3.8	11.7
84	2.3	7.1
82	1.6	4.9
80	1.0	3.1
73	0	0

SPILLWAY CAPACITY

C = 24'

<u>EL.</u>	<u>H.</u>	<u>C</u>	<u>H<sub>2</sub></u>	<u>Q (cfs)</u>	<u>H.</u>	<u>EL.</u>	<u>Notes</u>
1190.	-	-	-	-	-	1194.5	C-Frame Design
1192.	3.5	538	-	-	-	1193.5	Small Dam's
93	3.6	449	-	-	-	1190	P. 294
93.5	3.7	581	-	-	-	-	
94.	3.8	609	-	-	-	-	
94.5	3.9	691	-	-	-	-	
96.	4.1	910	-	-	-	-	
98.	4.3	1125	-	-	-	-	
1200.	4.5	1314	-	-	-	-	

Q over bridge  $Q = \frac{2}{3} \sqrt{2g} CL (H_1^{3/2} - H_2^{3/2})$



Lower Res.

$$L = 4.0 \left( \frac{24000}{12 \times 5280} \right) = 1.52 \text{ mi}$$

$$L_{ca} = 2.3 \text{ " } = 0.87 \text{ mi.}$$

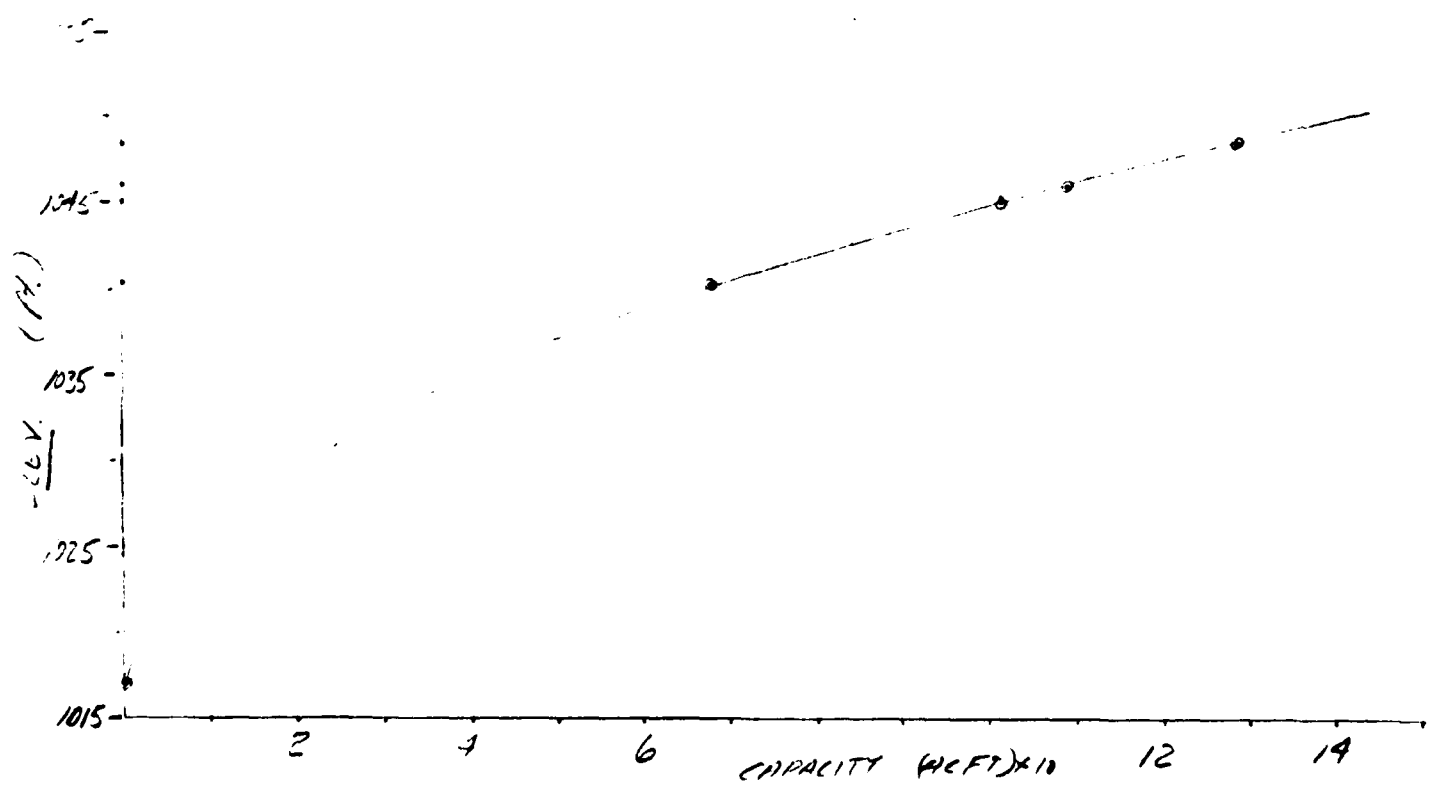
$$C_t = 2.0$$

$$t_p = C_t (L \times L_{ca})^{0.3} = 2 (1.52 \times .87)^{.3} = 2.17 \text{ hr.}$$

$$t_r = t_p^{1/5.5} = .40 \text{ hr}$$

$$T_p = t_p + 5t_r = 2.17 + .20 = 2.37$$

<u>Reservoir Capacity</u>	<u>Crest El. (Assumed)</u>	<u>1045.0</u>				
<u>Elevations (Inches)</u>	<u>Elevations (Actual - USGS)</u>	<u>Area</u>	<u>Area</u>	<u>Δ Vol. (Ac Ft)</u>	<u>Vol.</u>	<u>Σ</u>
1017	1017	0			0	
105	1040.2	5.92	2.96	65.1	65.1	
107.5	1045.	9.00	6.96	33.4	101.5	
110.2	1046.	8.22	5.11	8.1	109.6	
113.0	1048.2	9.43	8.33	19.4	129.0	





Lowell Res. cont.

SPILLWAY CAPACITY

$f = 50'$  Crest @ 1045.0 Flashboards = .85'  
will not fail

EL	H	<u>S</u>	<u>Q</u> (cfs.)	w/c Flashboards
1045.0	-	-	-	0
45.85	-	-	-	
46.00	.15	3.0	9	<del>35</del> 150
47.00	1.15	3.7	228	523
48.00	2.15	3.8	599	987
49.00	3.15	↓	1062	1520
1050.00	4.15	↓	1606	2124
51.00	5.15	↓	2220	2792
52.00	6.15	↓	2898	

DAM Length = 330'  $C = 3.0$

$\Sigma = 19.3"$  PMP

6 12 24 48  
111 123 133 142

NEW YORK STATE  
DEPT OF ENVIRONMENTAL CONSERVATION  
FISH PROTECTION BUREAU

3  
C  
O

K1 11.1.20 12. 4 51 03.51.

1.2.2

142

1.0  
1.0

•

1

INTER-UNIVERSITY JOURNAL OF THEATRE

1

1- 3517-

1207  
1198

23211  
23211

5.

•

•

**XI. PUBLIC TRUST RESERVE VS. ERCA LIVER ASIN**

## 1.22

142

1.0 c.1

476.

32

33

34

35

36

37

38

39

40

41

42

43

44

45

46

47

48

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1

1



UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
WASHINGTON, D.C. 20250

NOV 1960

ADONIS 0013-788X(1960)0000-0000

JOHN STACOFF

$\text{PLATE} = \text{I} + \text{II} = 6.18710 = 1$

YTS =	0.20	0.40	0.60	0.80	1.00
0.20	0.00	0.00	0.00	0.00	0.00
0.40	0.00	0.00	0.00	0.00	0.00
0.60	0.00	0.00	0.00	0.00	0.00
0.80	0.00	0.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	0.00	0.00

卷之五

卷之六

\*\*\*\*\*  
NOTIFICATION OF A FUTURE COMPUTATION

DATE	FREQ	REMARKS	TIME	TEMP	LOCN	STATE	JPLT	JPRT	GRADE	ISTAGE	TAUTE
			1000	1	0	0	2	C	1	0	0

```
IPROC      IPROG    IPRD     ISNCH   ISACF    LOCAL C  
HYPERGRAPH DATA          PATIF             O  
            TMSDA TXSPC  
SNAP        P-22
```

PRICIP DATA	R24	R48	R72	R96
142.00	142.00	142.00	142.00	142.00

22-NC CONTINUED ON THE PAGE 418 4. 0

[illegible]

UNIT INVENTORY DATA NYA# C  
TR# 1.17 CP#C.53

REVISION DATA  
 HYPER = 1.00  
 QIC = 2.00  
 AIC R = 7.29 1-INTERVALS

[illegible]

100-411-103

[illegible]







.....

—

10

1511-1512

IL. OFF. PAP.  
1900. 20  
55.  
21.

[illegible]

.....

—

INITIAL VALUE	SPIRALAY CRIST	TOP OF CRIST
102.50	1045.00	1040.00
102.	102.	107.
102.	102.	109.

[illegible]

APPENDIX D  
REFERENCES

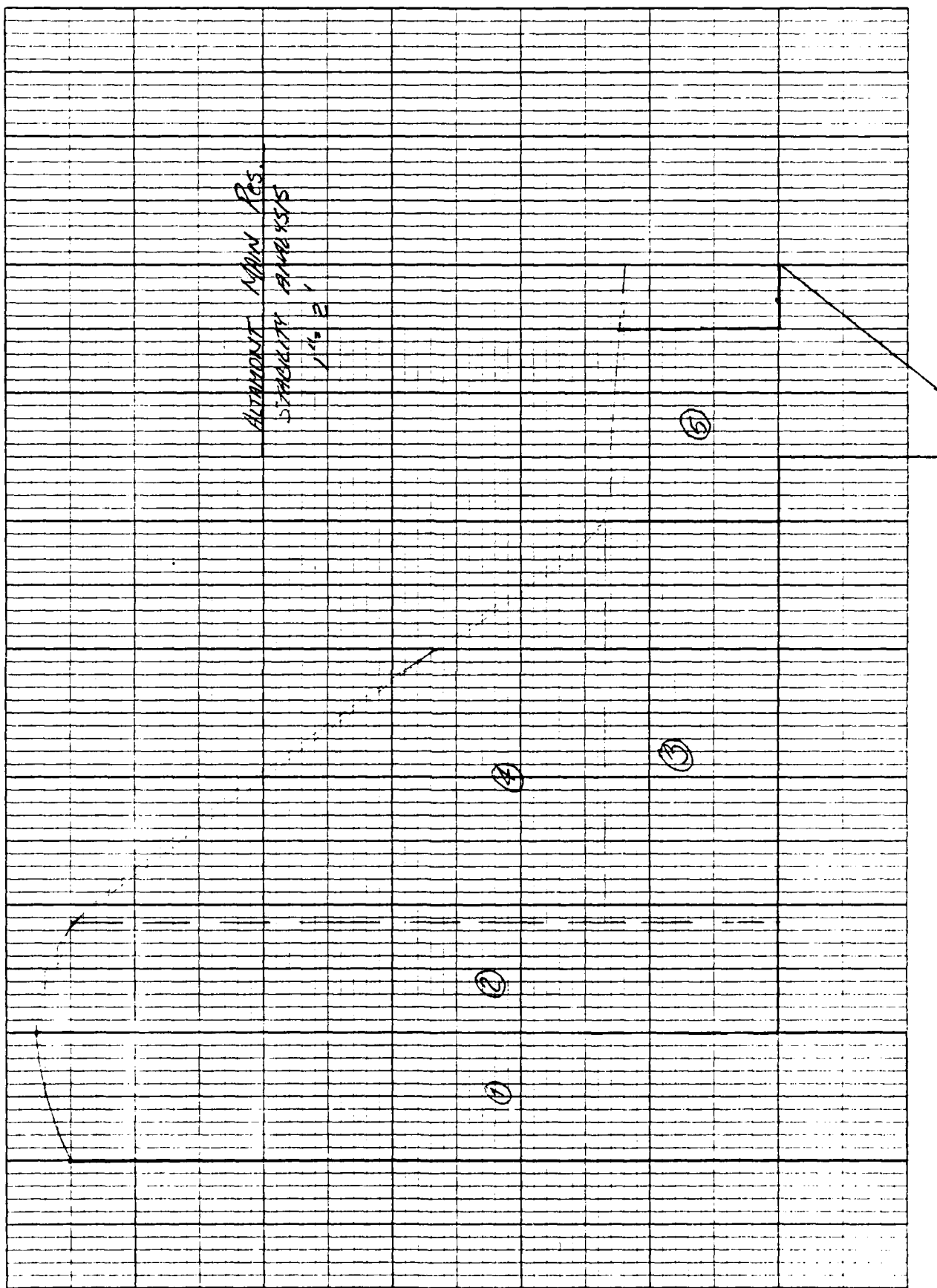
## APPENDIX D

### REFERENCES

- 1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May 1961.
- 2) U.S. Department of Commerce, Hydrometeorological Report No. 33, Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas from 10 to 1,000 Square Miles and Durations of 6, 12, 24, and 48 Hours; April 1956.
- 3) Soil Conservation Service, National Engineering Handbook, Section 4, Hydrology, August 1972 (U.S. Department of Agriculture).
- 4) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th edition, McGraw-Hill, 1963.
- 5) T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1965.
- 6) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.
- 7) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.
- 8) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes, Information Bulletin 119, 1977.

APPENDIX E  
STABILITY ANALYSIS

ALTIMONT MAIN RES.  
STABILITY ANALYSIS  
1" = 2'



# STABILITY ANALYSIS PROGRAM - WORK SHEET

## INPUT ENTRY

## ANALYSIS CONDITION

		1	2	3	4	5
Unit Weight of Dam (K/ft <sup>3</sup> )	0	15				
Area of Segment No. 1 (ft <sup>2</sup> )	1	26.5				
Distance from Center of Gravity of Segment No. 1 to Downstream Toe (ft)	2	12.0				
Area of Segment No. 2 (ft <sup>2</sup> )	3	19.69				
Distance from Center of Gravity of Segment No. 2 to Downstream Toe (ft)	4	10.25				
Area of Segment No. 3 (ft <sup>2</sup> )	5	16.38				
Distance from Center of Gravity of Segment No. 3 to Downstream Toe (ft)	6	5.13				
Base Width of Dam (Total) (ft)	7	13.0				
Height of Dam (ft)	8	11.5				
Ice Loading (K/L ft.)	9	7.5				
Coefficient of Sliding	10	0.6				
Unit Weight of Soil (K/ft <sup>3</sup> ) (deduct 18)	11	0.13				
Active Soil Coefficient - Ka	12	0.213				
Passive Soil Coefficient - Kp	13	3.5				
Height of Water over Top of Dam or Spillway (ft)	14	0	0	3.55	4.2	0
Height of Soil for Active Pressure (ft)	15	8				
Height of Soil for Passive Pressure (ft)	16	4.442				
Height of Water in Tailrace Channel (ft)	17	0	0	1.2	1.4	0
Height of Water (K/ft <sup>3</sup> )	18	0.624				
Area of Segment No. 4 (ft <sup>2</sup> )	19	25.94				
Distance from Center of Gravity of Segment No. 4 to Downstream Toe (ft)	20	6.167				
Height of Ice Load or Active Water (ft) (does not include 14)	46	11.5	10.0	11.5	11.5	11.5
Seismic Coefficient (g) (AREA OF SEGMENT No. 5 INCLUDED)	50	0	0	0	0	2.1
<u>RESULTS OF ANALYSIS</u>						
Factor of Safety vs. Overturning		5.151	2.456	4.006	3.851	4.939
Distance From Toe to Resultant		6.669	4.826	6.294	6.224	6.600
Factor of Safety vs. Sliding		5.262	2.324	3.456	3.251	2.752

ALTAMONT MAIN RESERVOIR DAM  
STABILITY ANALYSIS  
SPILLWAY SECTION

Case I Normal Loading

- (a) 5.151042071
- (b) 6.66899593
- (c) 5.262197513

Case IV PMF

- (a) 3.851042200
- (b) 6.224132081
- (c) 3.251358656

Case II Ice Loading

- (a) 2.455973494
- (b) 4.825527573
- (c) 2.324044627

Case V Seismic Loading

- (a) 4.938977186
- (b) 6.600018004
- (c) 2.752019094

Case III 1/2 PMF

- (a) 4.005918355
- (b) 6.294096004
- (c) 3.456260193

NOTE: (a) is the factor of safety for overturning;  
(b) is the location of the resultant from the toe;  
(c) is the factor of safety for sliding.



APPENDIX F

DRAWINGS

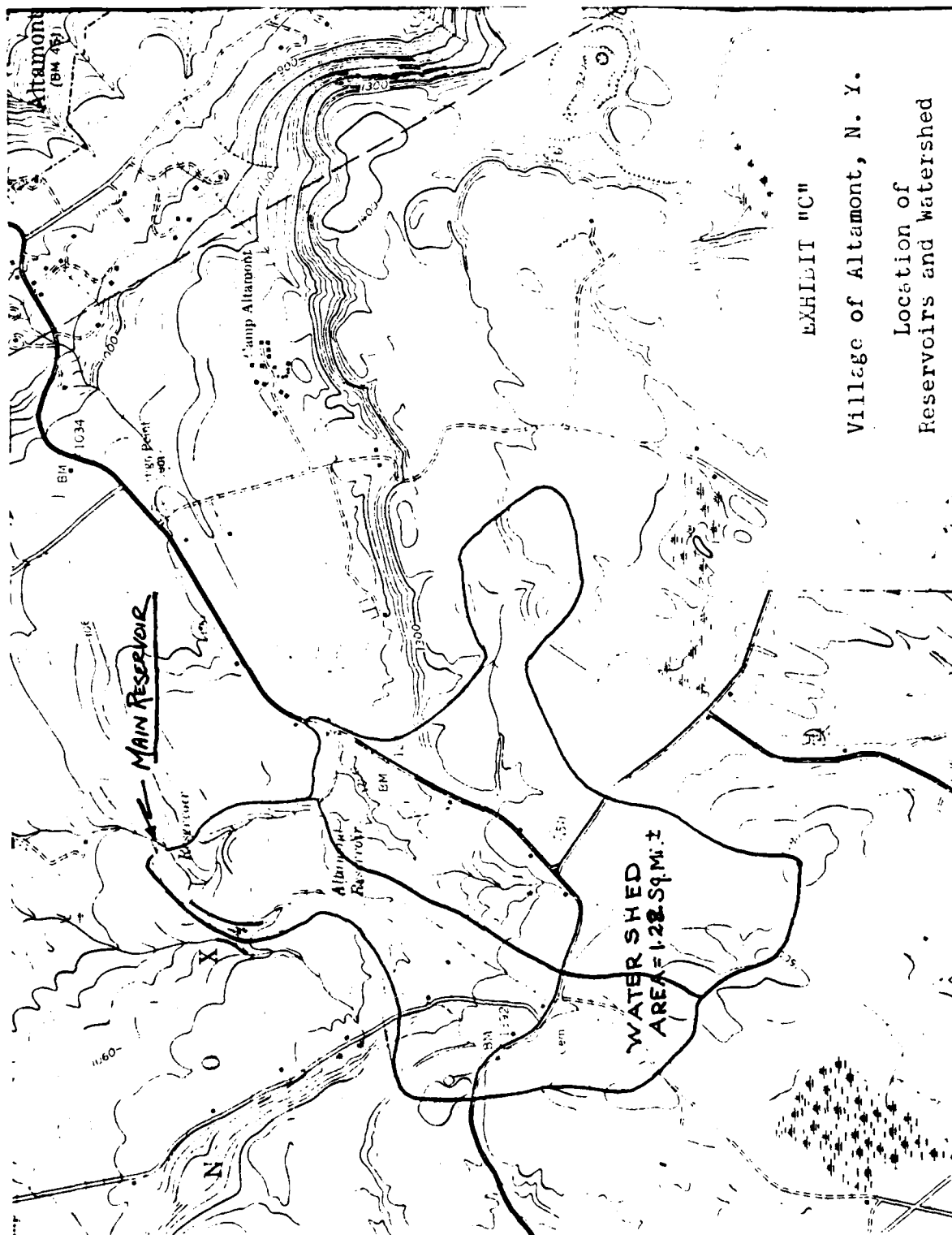
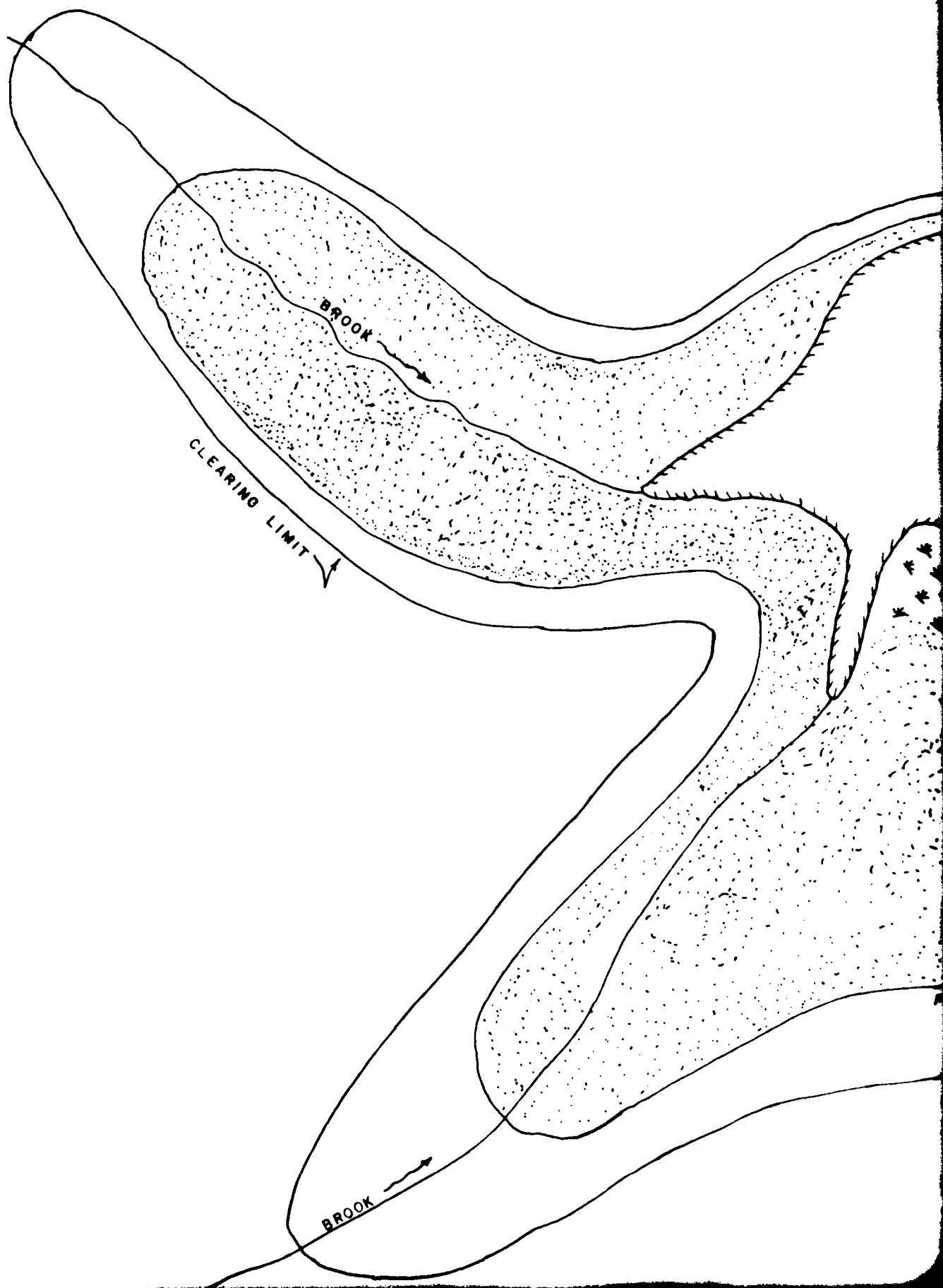


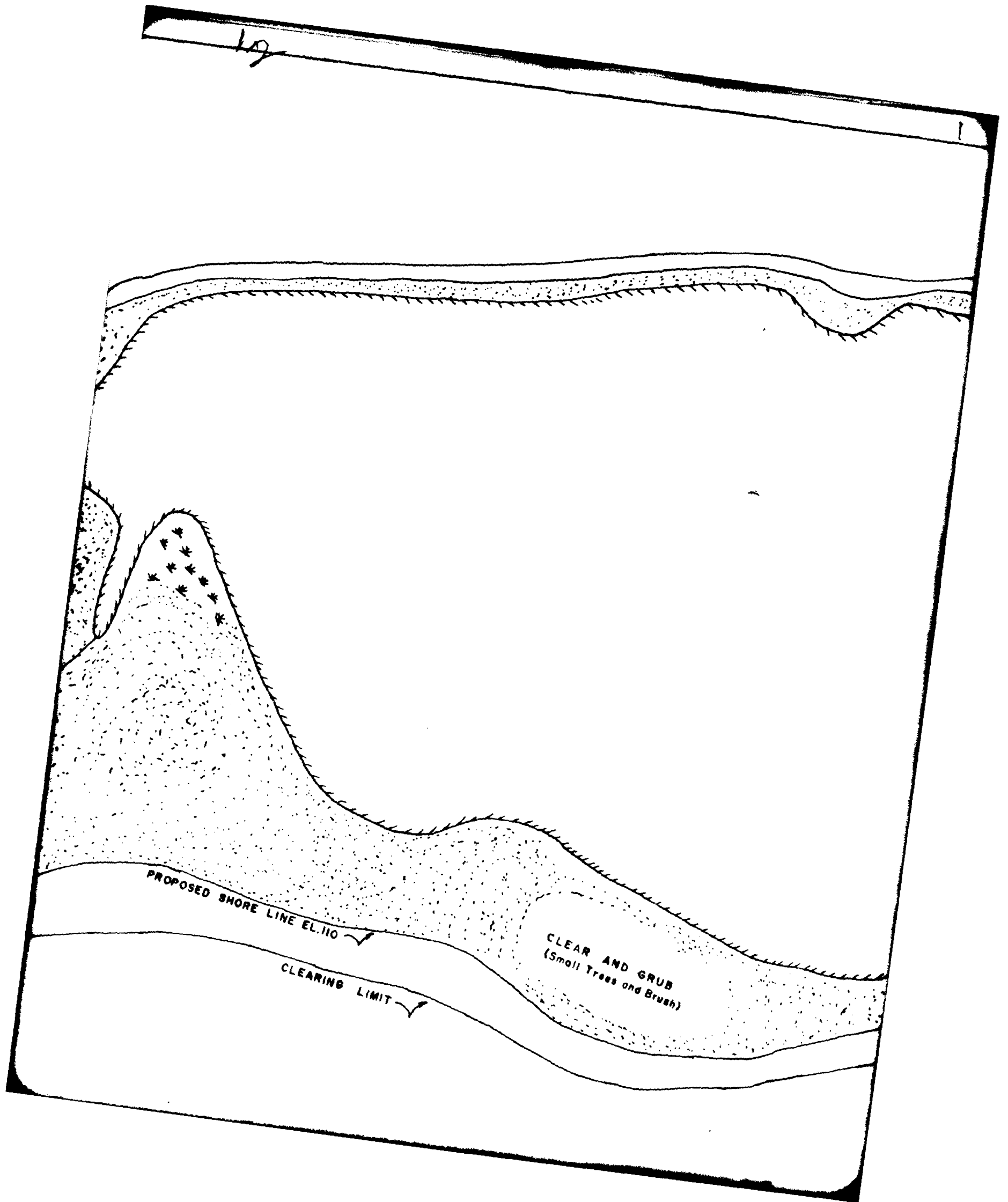
EXHIBIT "C"

Village of Altamont, N. Y.

Location of  
Reservoirs and Watershed

VICINITY MAP





13

MAIN

RESERVOIR

N.W.S. EL. 105

EXISTING SPILLWAY CREST EL. 104.8  
PROPOSED EL. 109.8

AREA TO BE CLEARED AND GRUBBED ——— 2.5± ACRES

AREA TO BE CLEARED TO STUMP ——— 1.6± ACRES

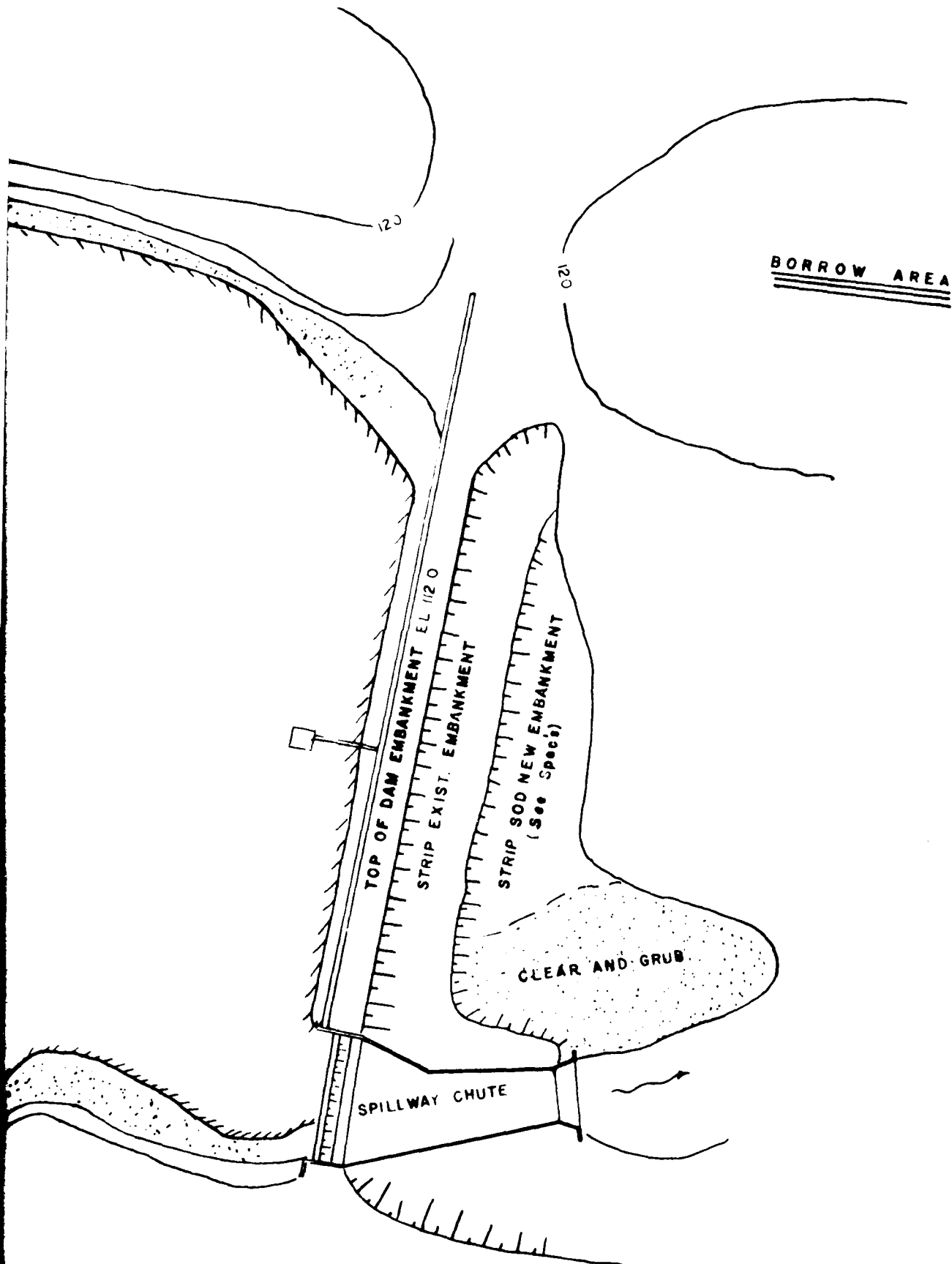
EXISTING SHORE LINE EL. 105

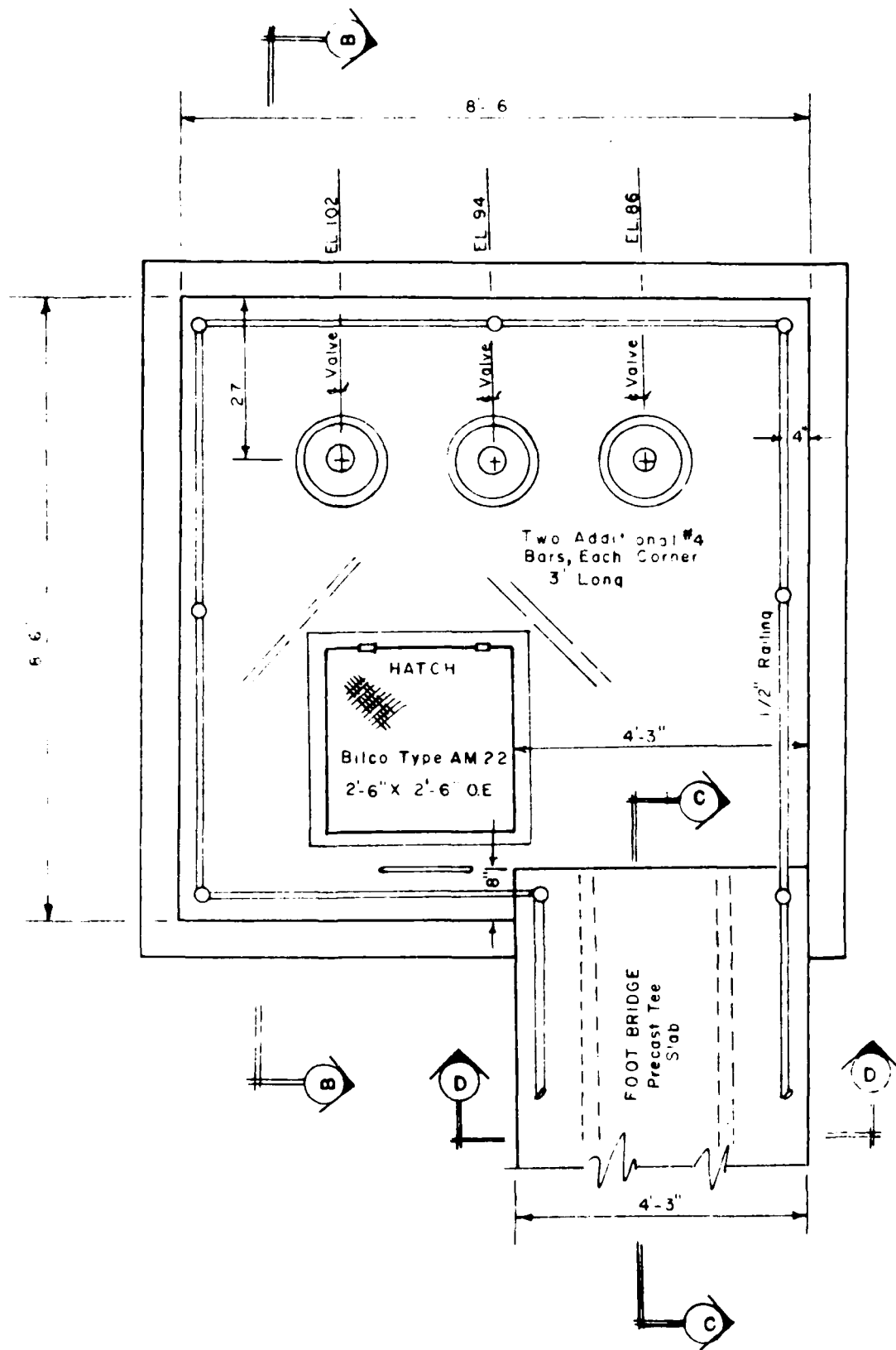
110

113

GENERAL SITE PLAN

SCALE 1" = 50'

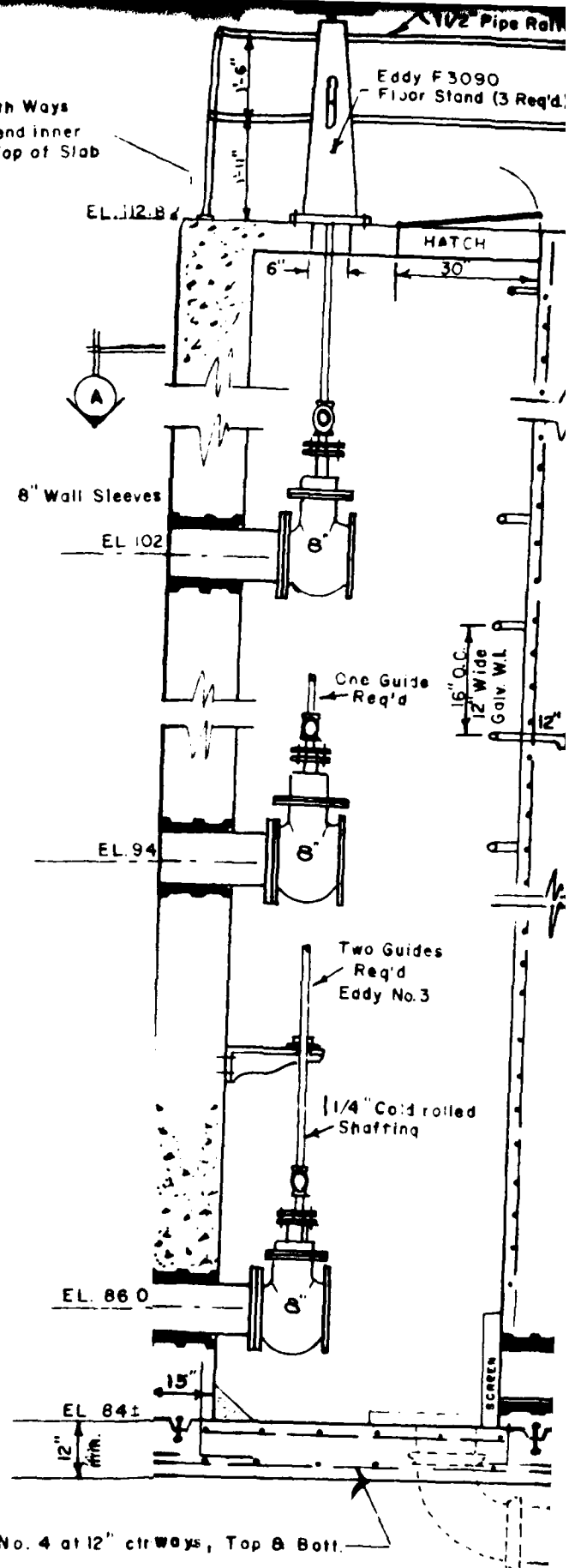
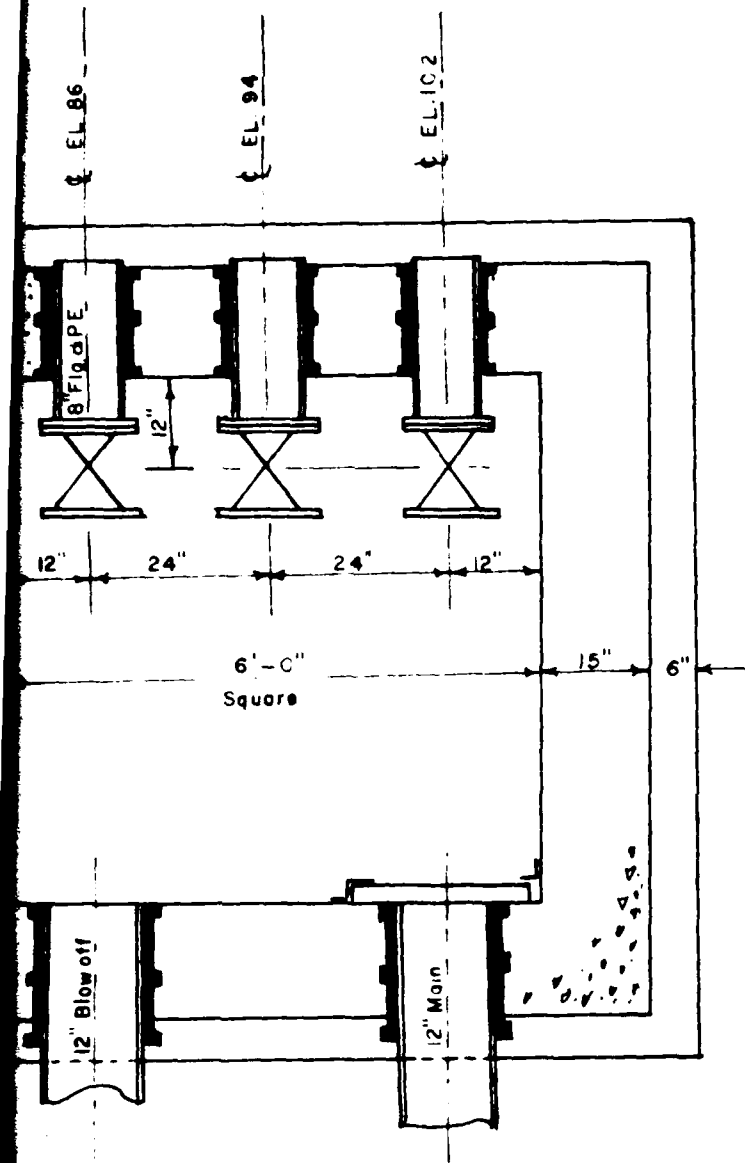




**GATE HOUSE-PLAN**

SCALE 1/2" = 1'-0"

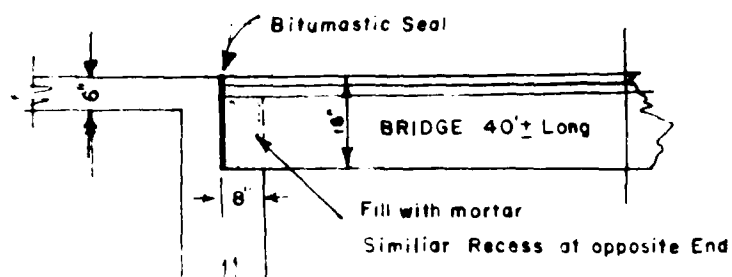
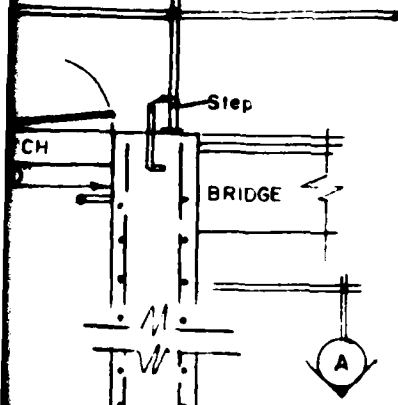
Slab Reinf: No. 4 at 12" ctrs Both Ways  
Top and Bottom. Bend inner  
Wall Bars 18" into Top of Slab



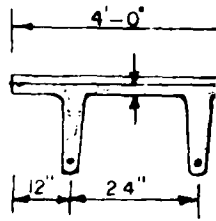


30  
nd (3 Req'd)

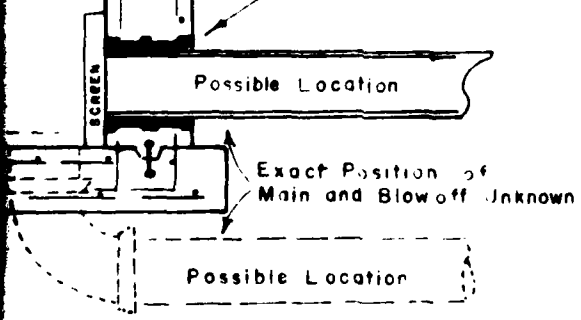
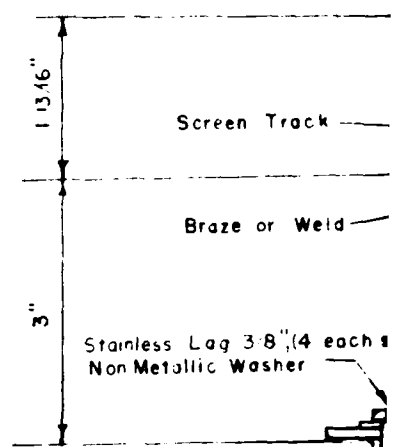
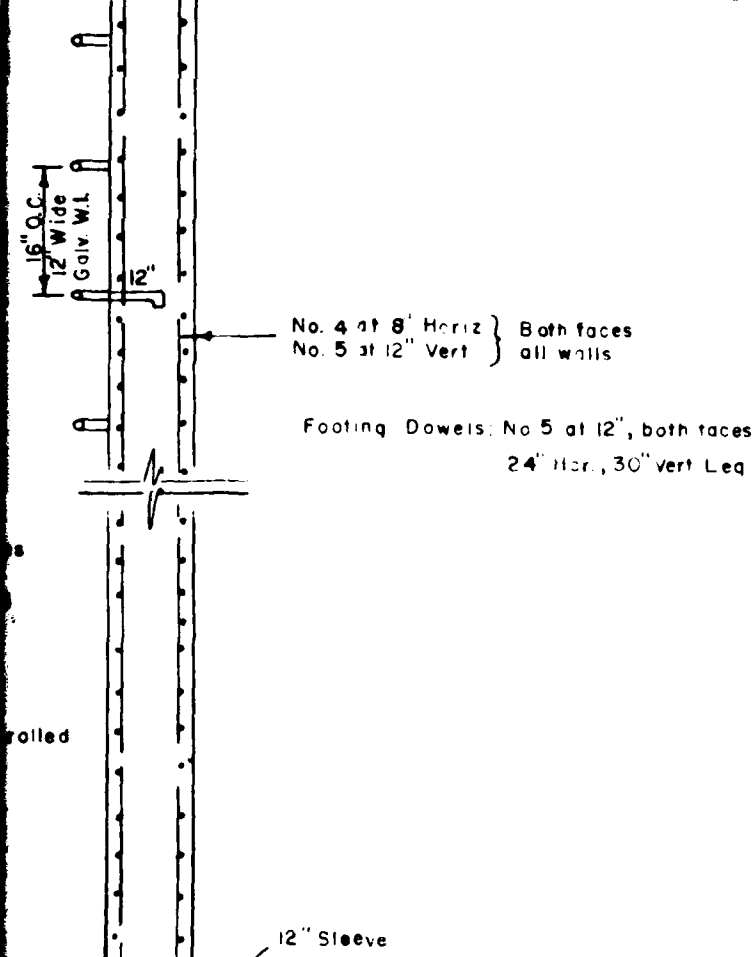
Precast double Tee Section 38 lbs/SF De



SECTION C-C



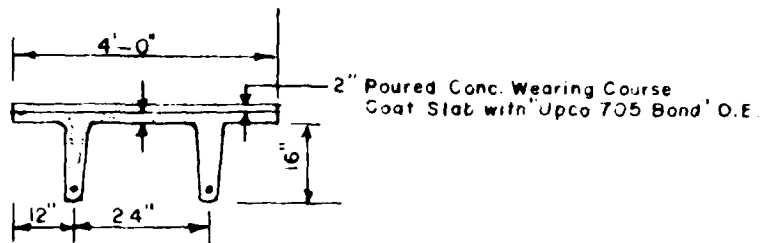
SECTION I



B-B  
1'-0"

17

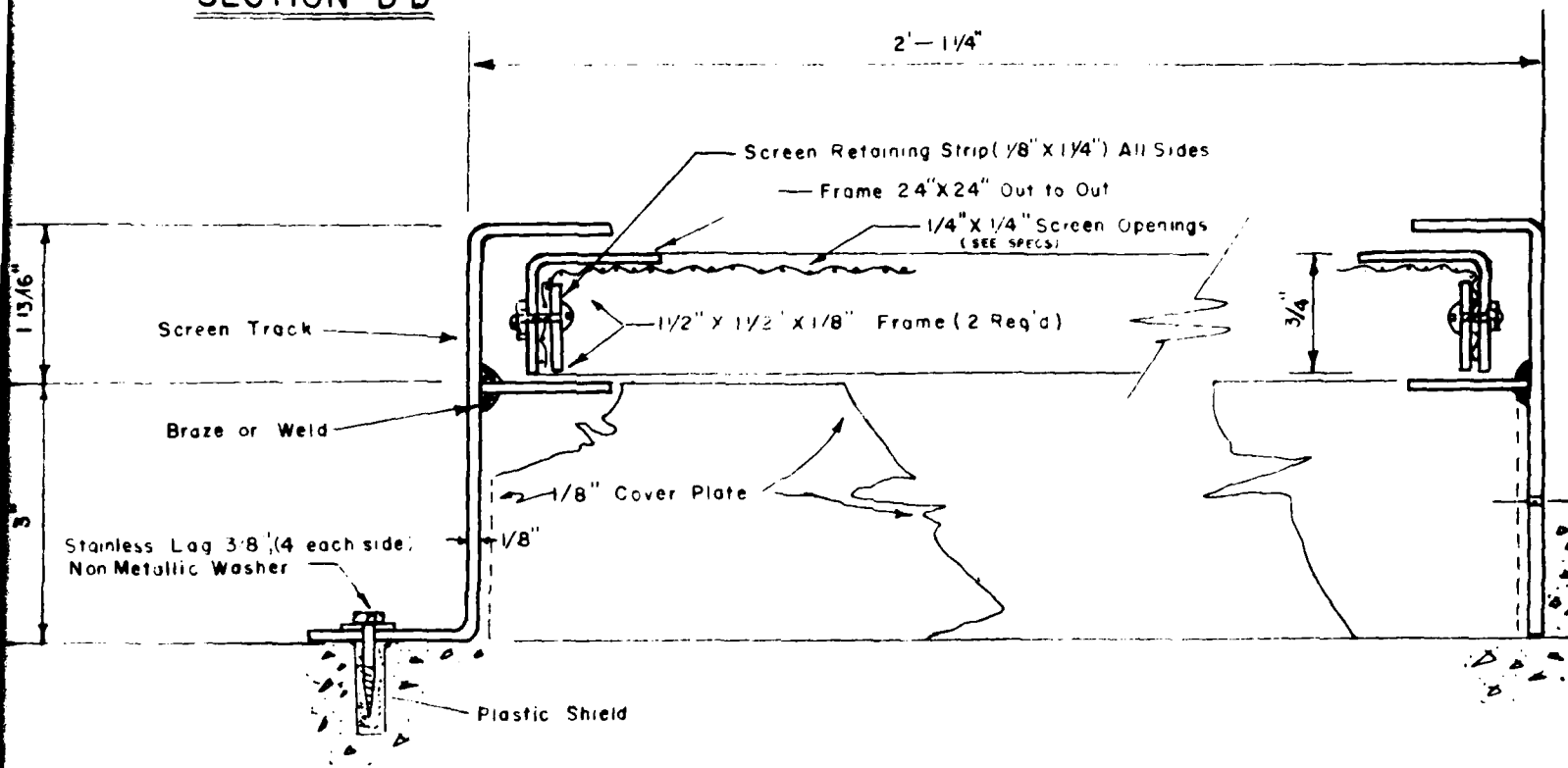
Double Tee Section 38 lbs/SF Design



SECTION D-D

NOTE:

Screen Track, Frame, Screen and Fastn  
All Bronze or A1 Stainless Steel, 1



SCREEN DETAIL 1/2 SIZE

Contract No 2

VILLAGE OF ALTA

ALBANY CO.

RAISE MAIN RESER

SITE PLANS

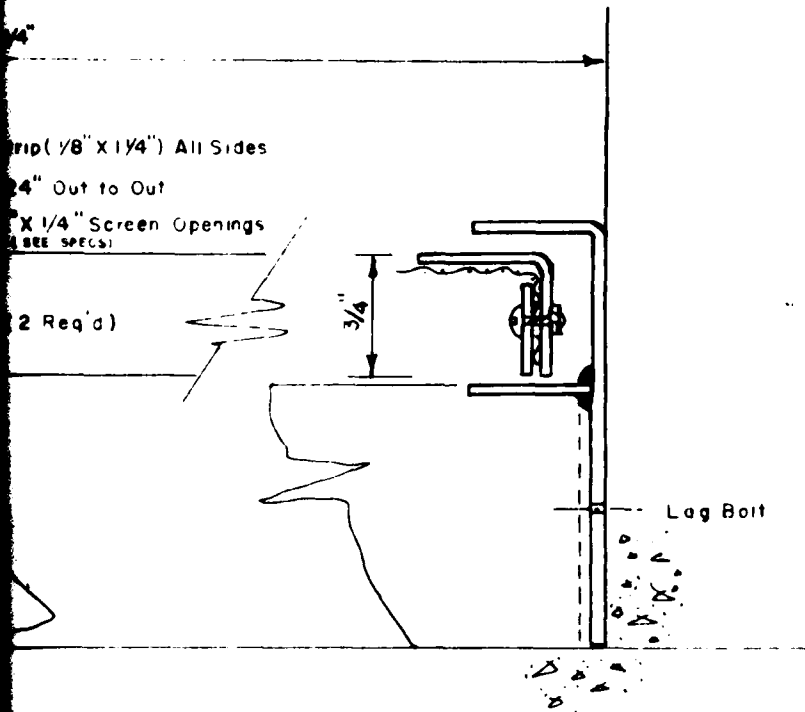
MARCH 1961

ROBERT J. GANLEY  
CONSULTING ENGINEER  
36 STATE STREET  
ALBANY, NEW YORK

*Robert J. Ganley*

NOTE:

Screen Track, Frame, Screen and Fastenings to be of  
All Bronze or All Stainless Steel, 1/8" Thick



TAIL 1/2 SIZE

Contract No 2

VILLAGE OF ALTAMONT

ALBANY CO

NEW YORK

RAISE MAIN RESERVOIR 5 FT.

SITE PLANS

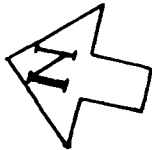
MARCH 1961

ROBERT J. GANLEY  
CONSULTING ENGINEER  
36 STATE STREET  
ALBANY, NEW YORK

1 of 3 sheets

NOTES:

1. Two W.I. Pipe Valve Markers, 52" High, Set in Concrete Found. 18" Deep  
Place Markers 10' Either Side of Valves— Paint Blue, Two Coats
2. Attach Level Gauge (furnished by others) to Concrete Wall.



Existing pump house to remain

Remove valve house and  
install valve boxes

115

118

116

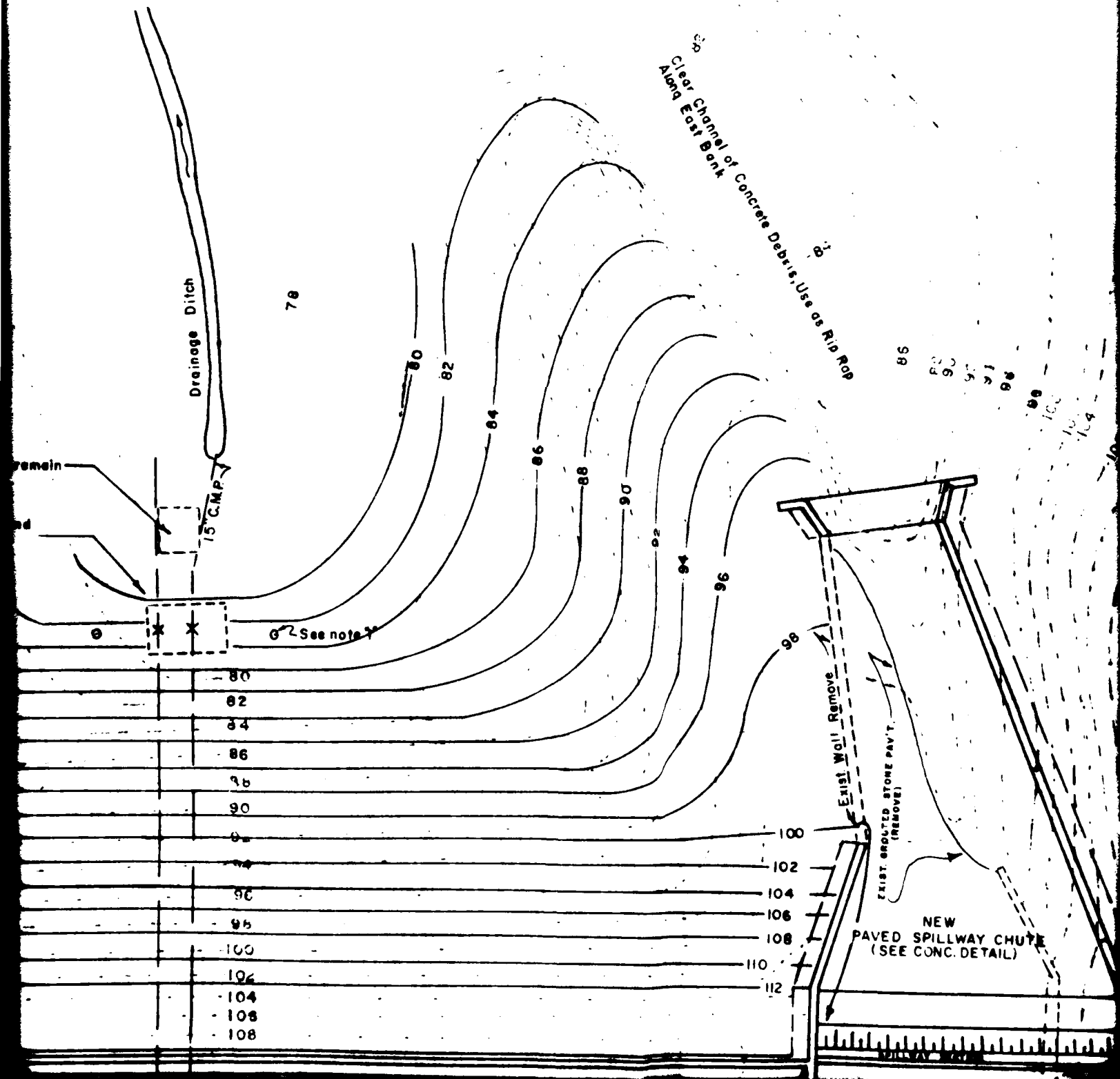
114

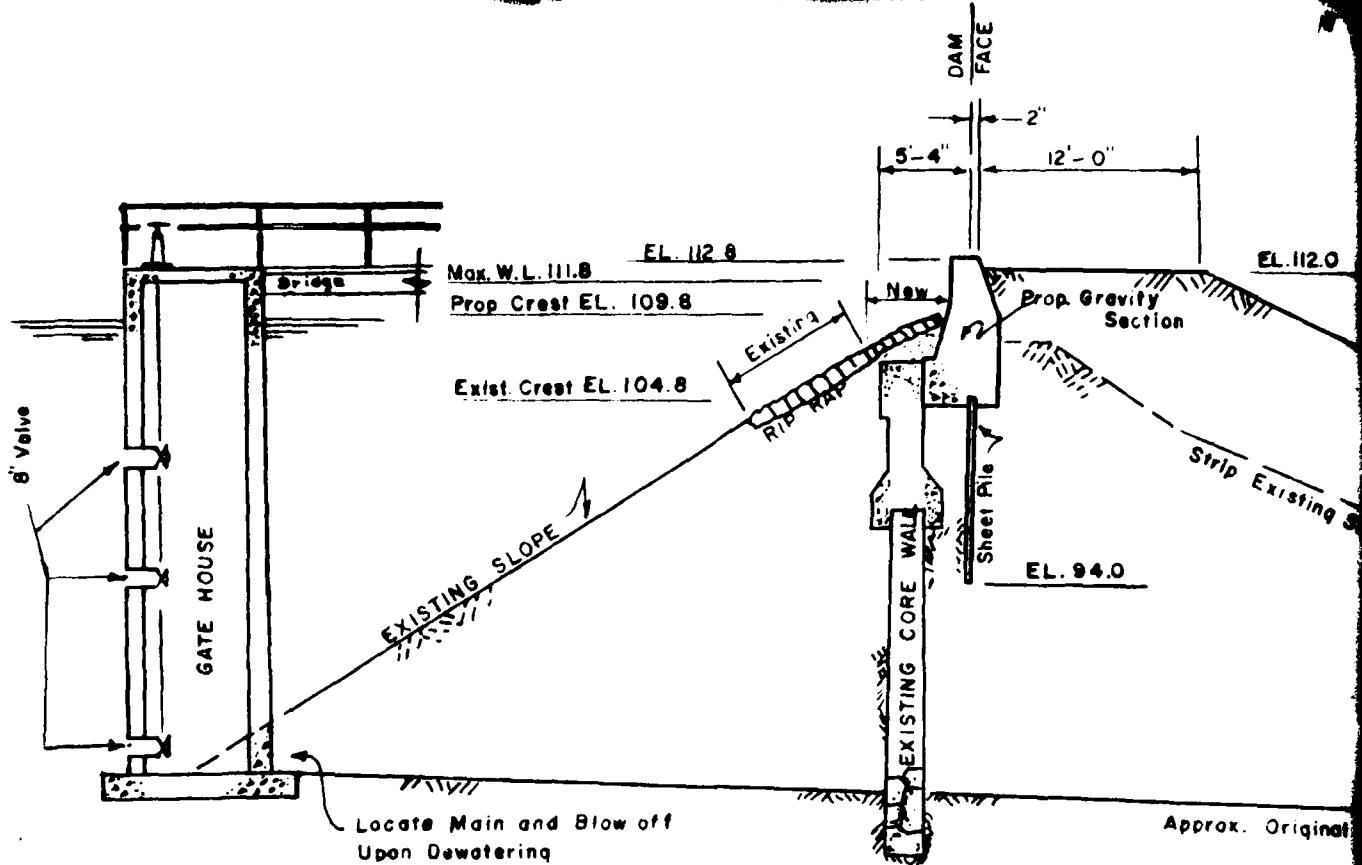
112

110

12

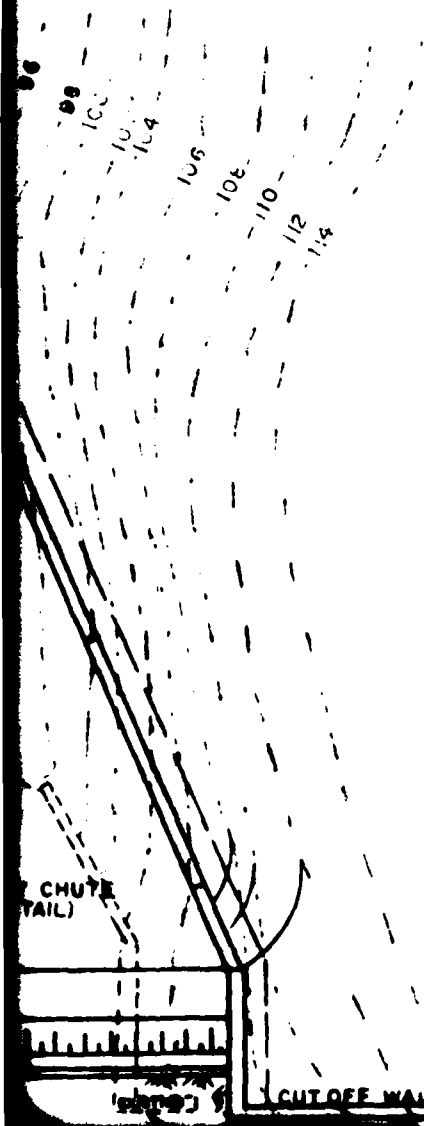
4. 18" Deep  
soils

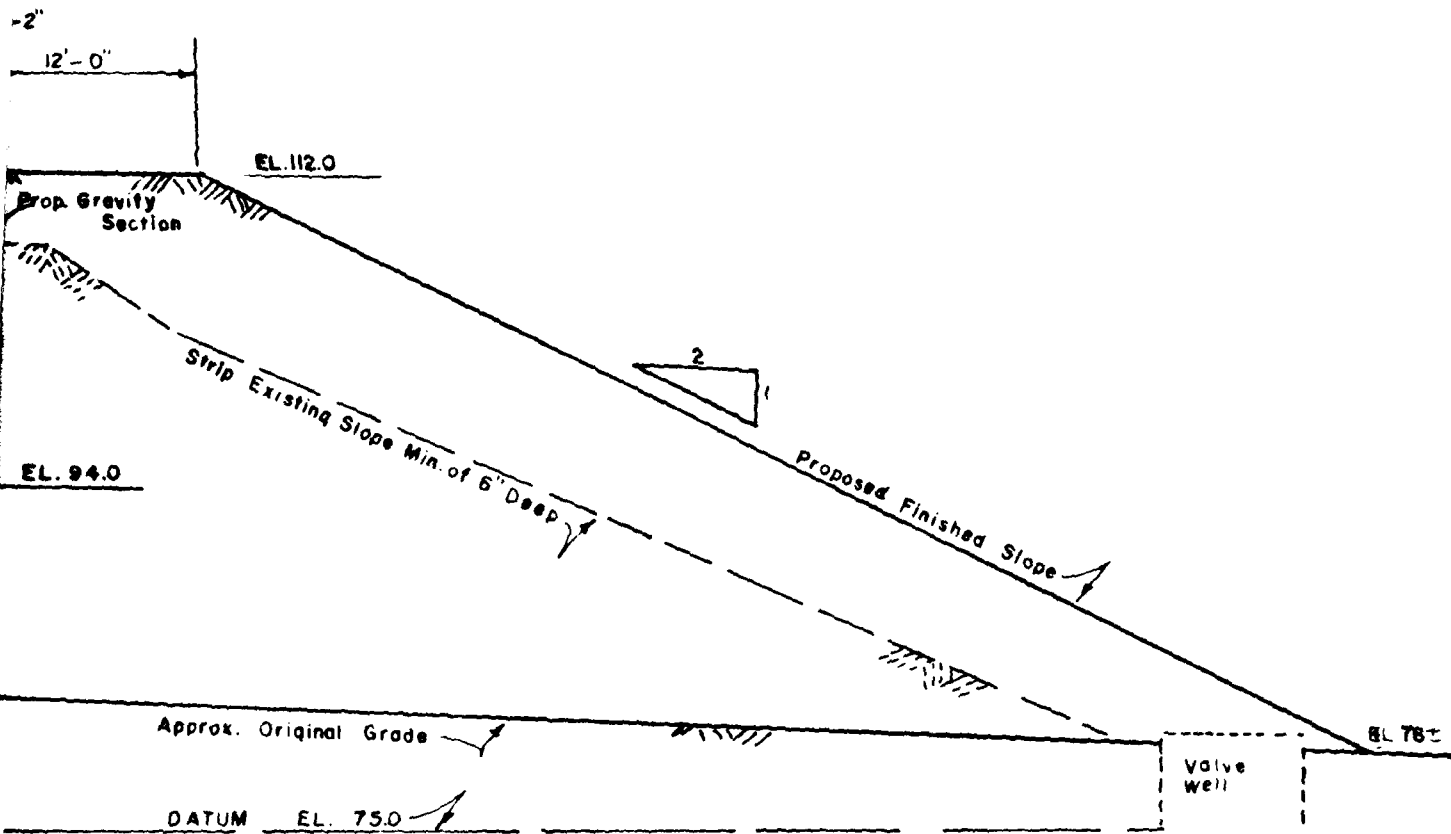




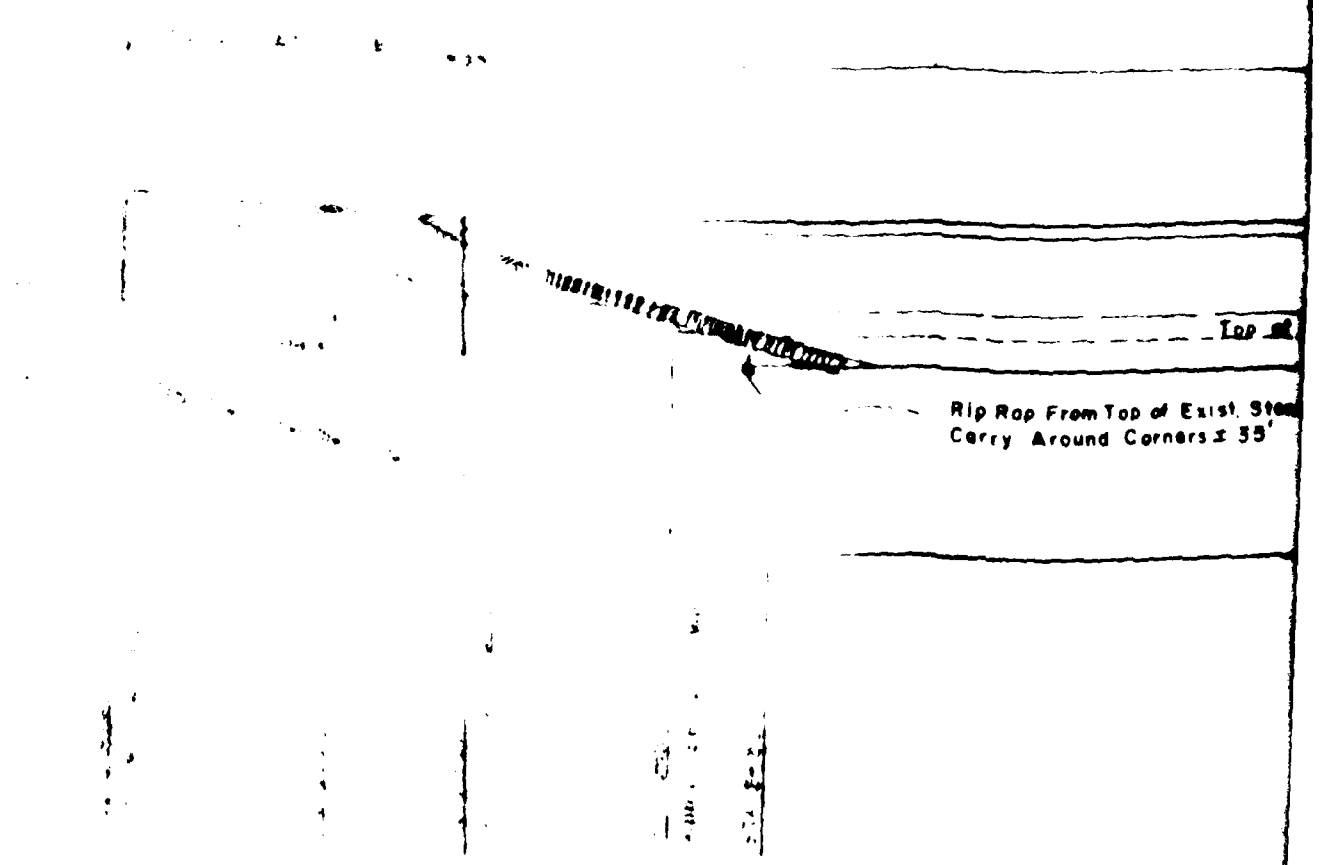
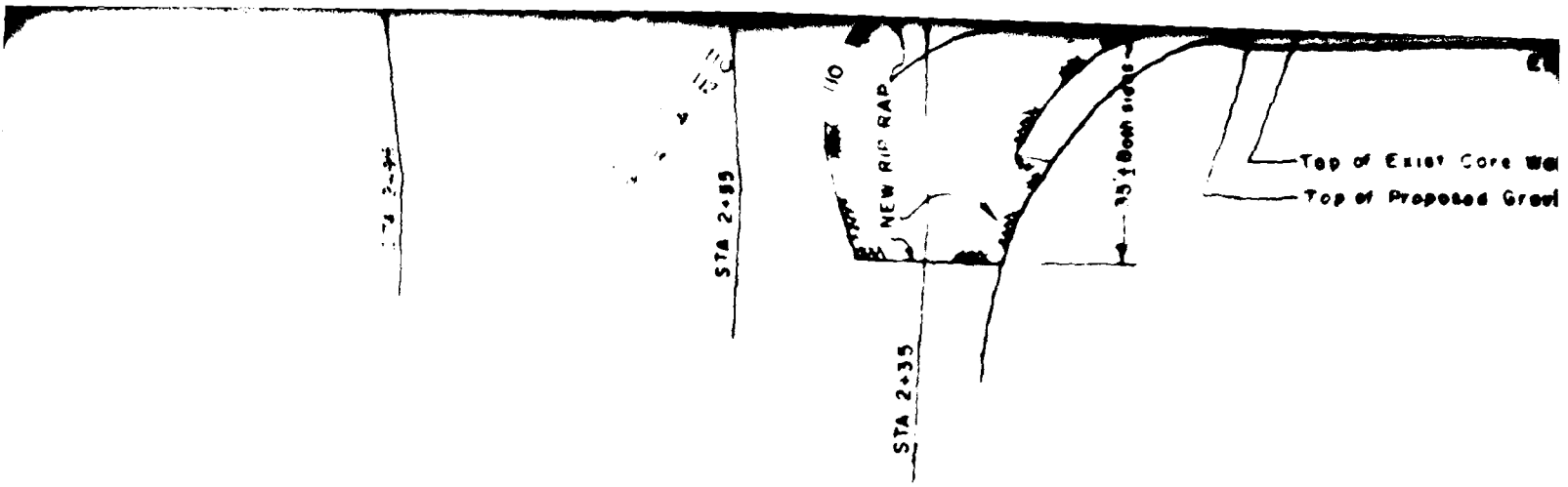
**SECTION STATION 1+10**

SCALE 1" = 10'





**STATION 1+10**





Well EL. 106.8  
Gravity Section EL. 112.8

12' C.I. Main  
STA. 1+10  
12' C.I. Blow off



GATE HOUSE (See Sh. No. )

STA. 0+00

EXISTING  
Proposed

## PLAN OF DAM

SCALE 1" = 20'

Contour Interval = 2'

### GRAVITY SECTION

SPILL

Top of Gravity Sect. EL. 112.8

Fin. Gr. Back of Wall EL. 112.0

Top of Exist. Embankment EL. 108

EL. 110

Exist. Core Wall EL. 106.8

Bottom of Gravity Section

Work to EL. 110.0,

Bottom of Sheet Pile Cutoff Wall EL. 94.0

STA. 0+01 End Sheet Pile

STA. 0+00 Face of Wall

See Elevation

## ELEVATION UPSTREAM FACE OF DAM

SCALE: 1" = 50' Horizontal  
1" = 10' Vertical

Proposed Crest Elevation 109.8

STA 0+00

STA 0+50

STA 0+70

STA 0+80

SPILLWAY SECTION

CUTOFF WALL

EL. 109.8

STA 0+01 End Sheet File

STA 0+00 Face of Wall

See Elevation of Spillway (Concrete Details)

STA 0+80

STA 0+80

7

Contract No 2

VILLAGE OF ALTAMONT

ALBANY CO

NEW YORK

RAISE MAIN RESERVOIR 5 FT.

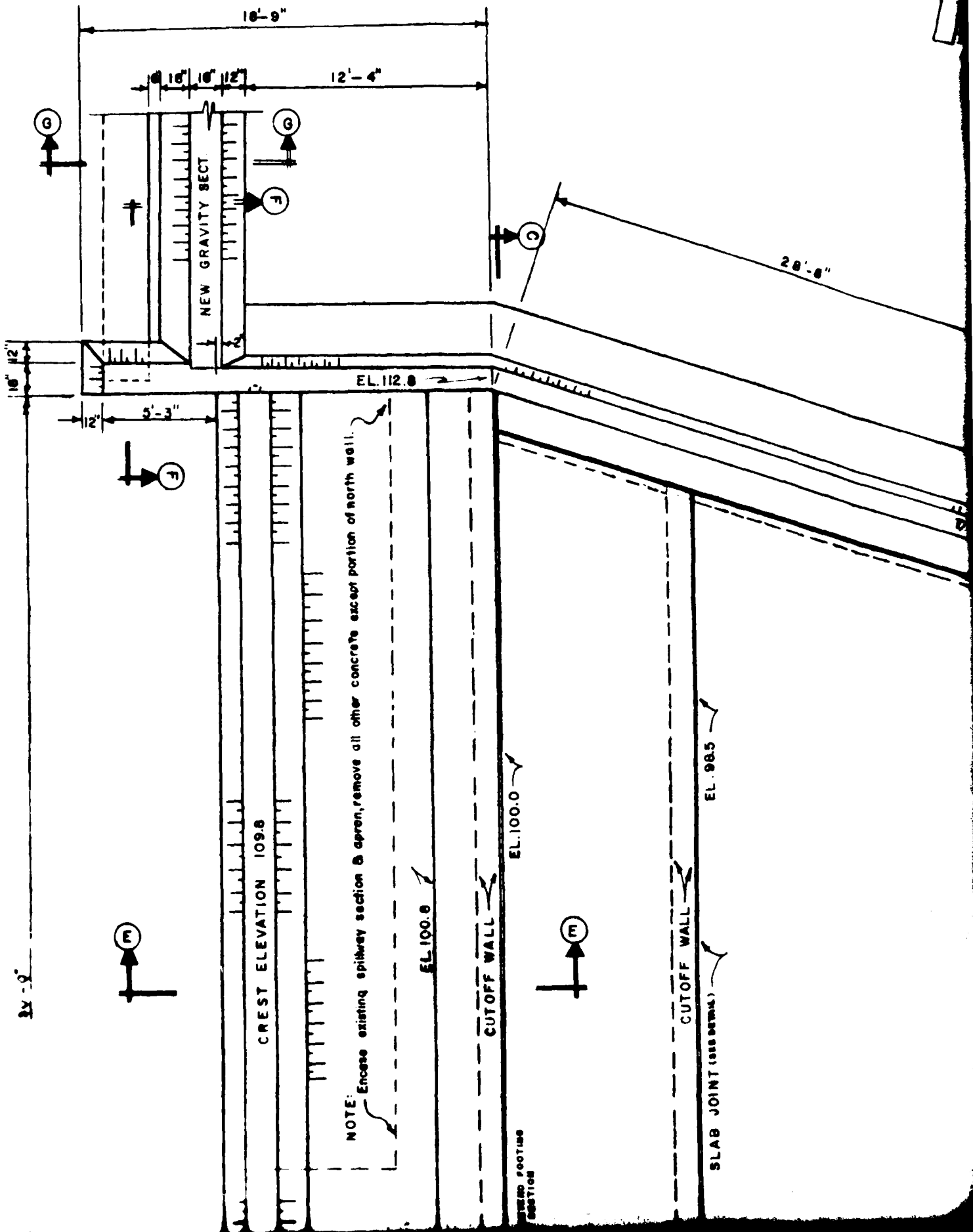
PLAN & DETAILS

MARCH 1961

ROBERT J. GANLEY  
CONSULTING ENGINEER  
36 STATE STREET  
ALBANY NEW YORK

2  
of  
3 Sheets

*Robert J. Ganley*

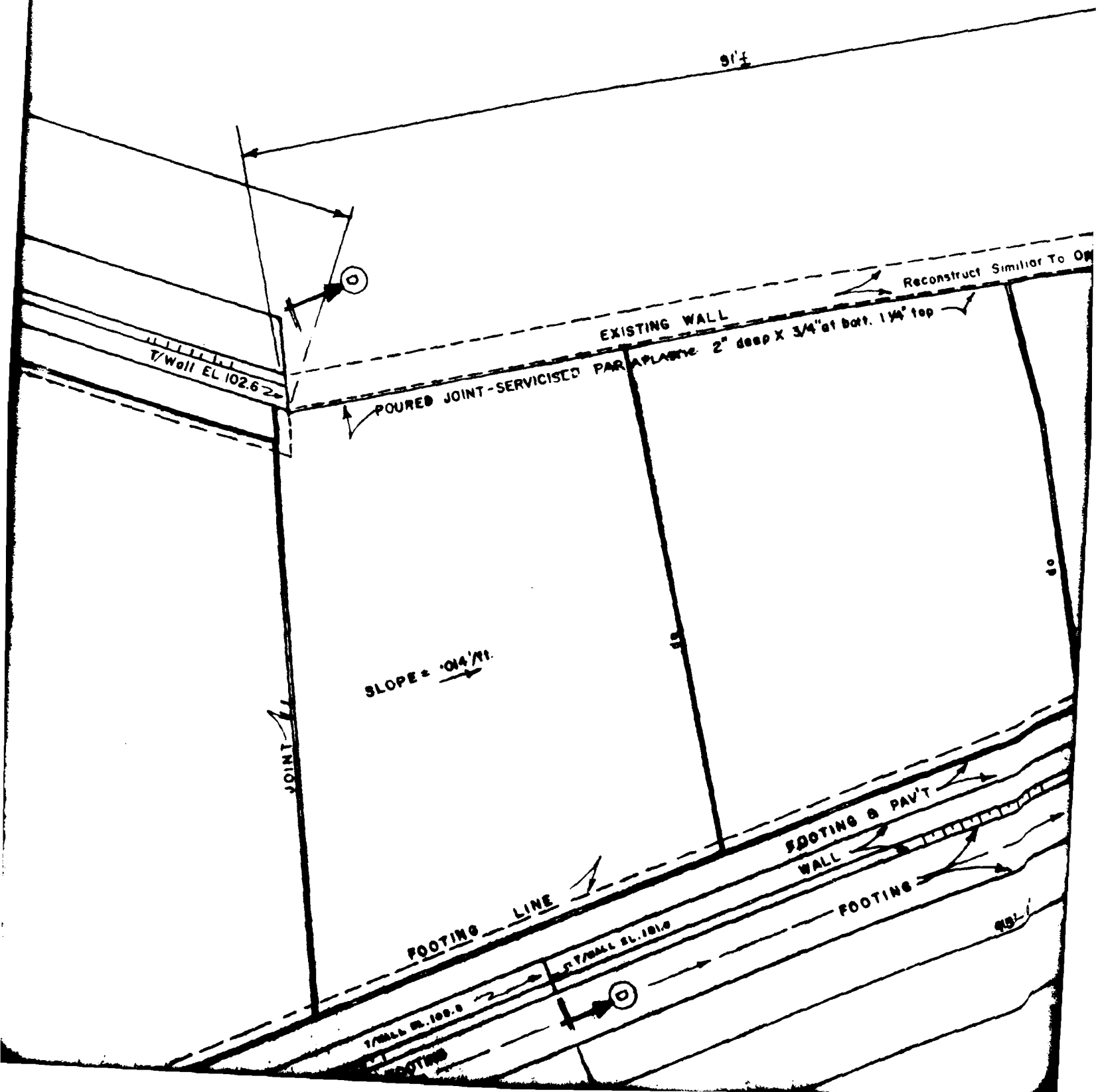




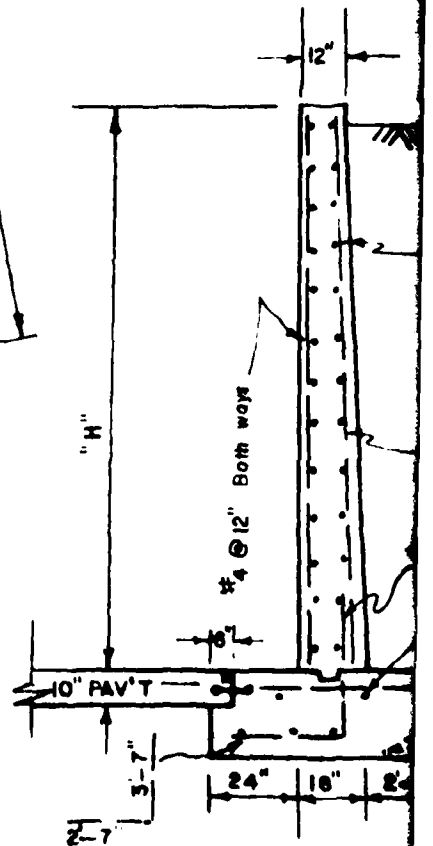
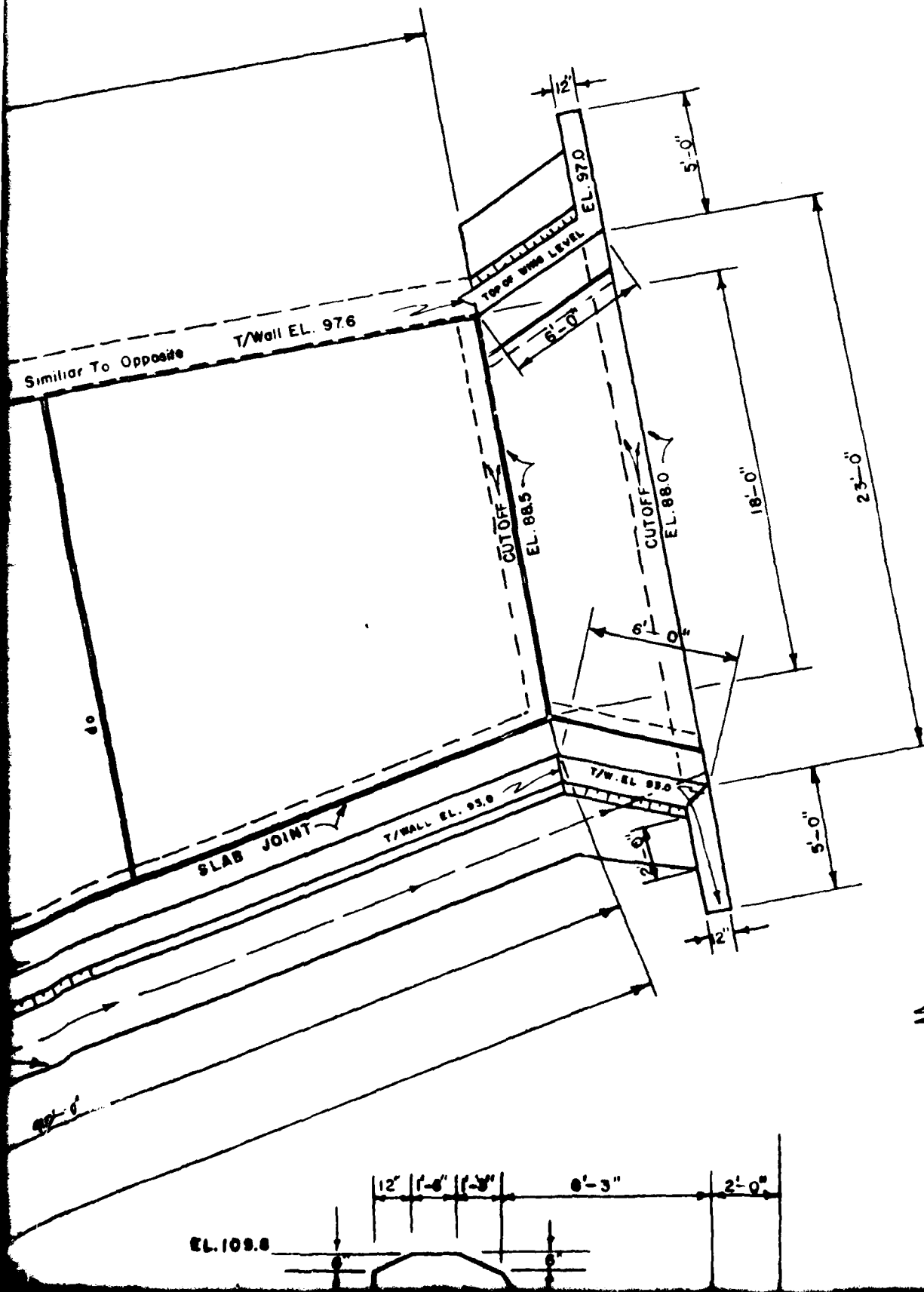
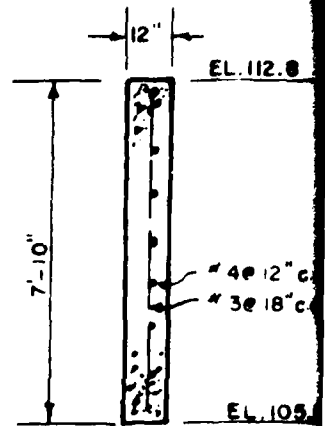
NOTES:

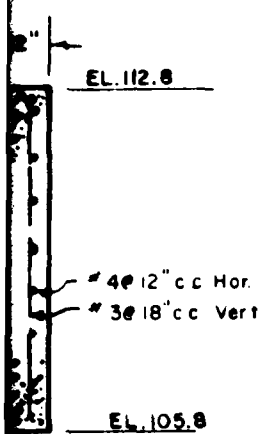
1" chamfer on all exposed concrete corners

All exposed surfaces to be rubbed to remove form marks.



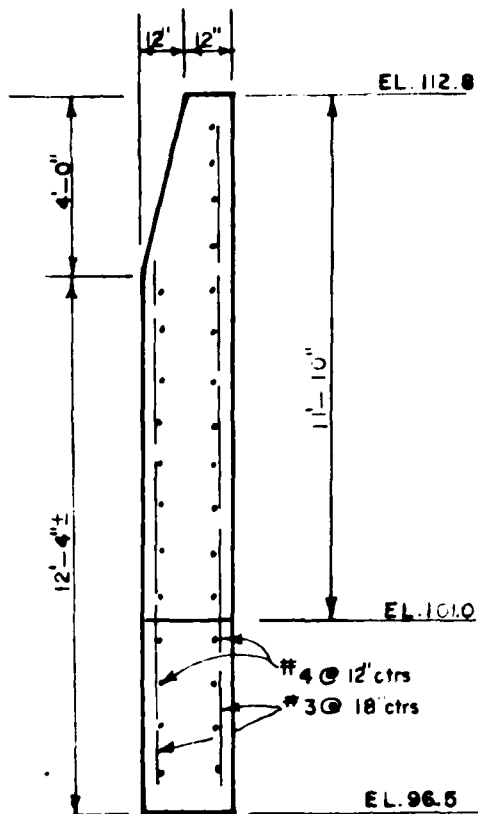
13





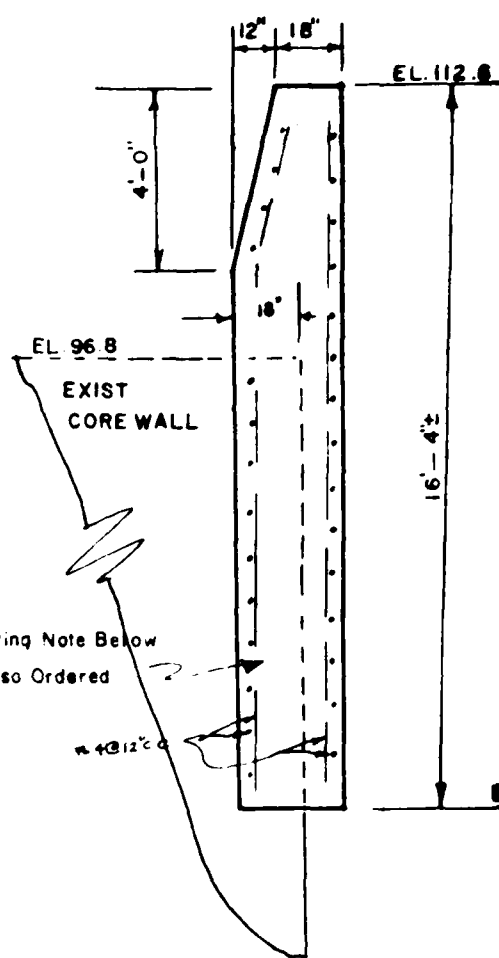
SECTION A-A

1/4" = 1'-0"



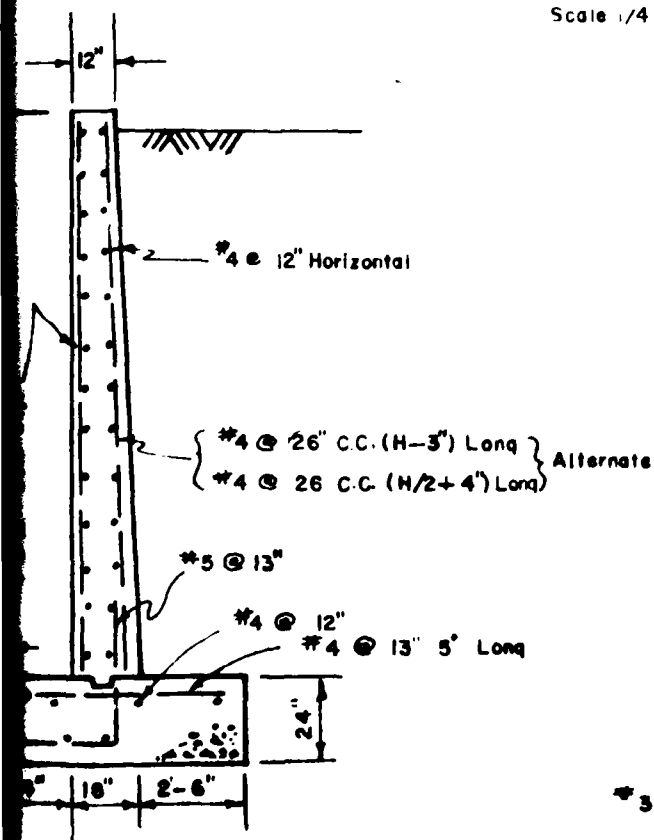
SECTION B-B

Scale 1/4" = 1'-0"



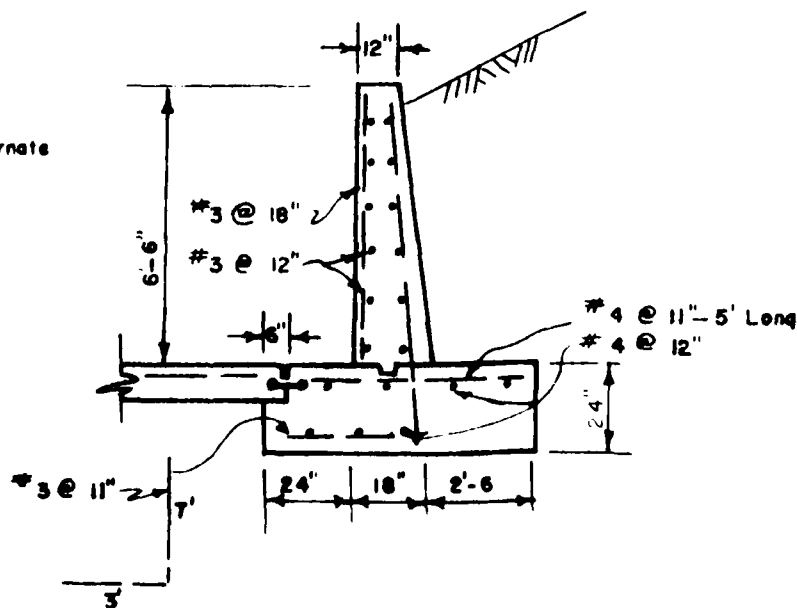
SECTION F-F

Scale 1/4" = 1'-0"



SIDE WALL OVER 6'-6" HIGH

Scale 1/4" = 1'-0"



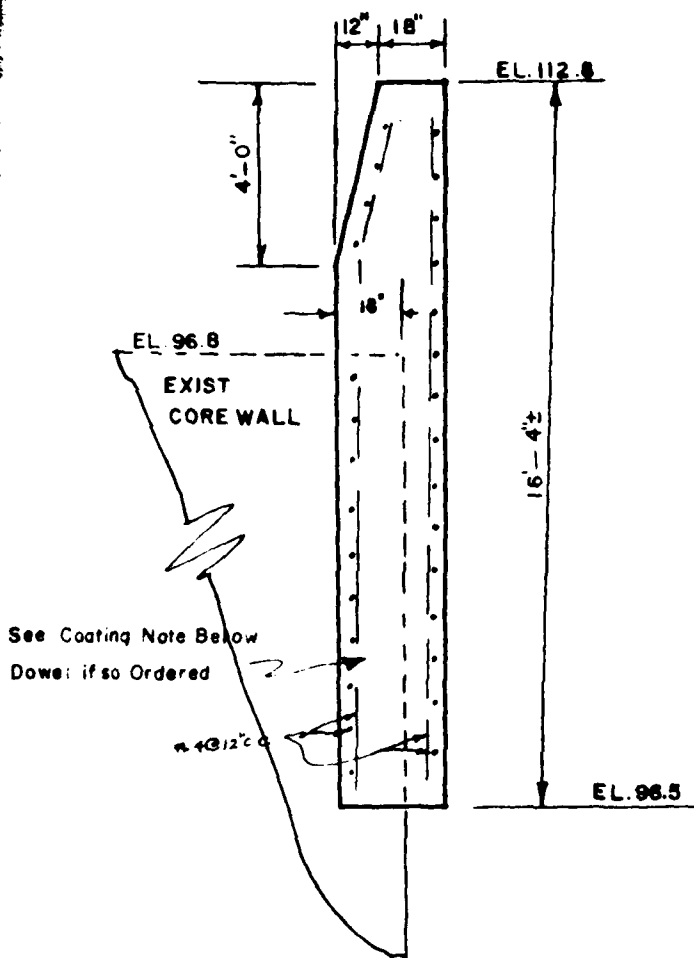
SIDE WALLS 6'-6" HIGH

Scale 1/4" = 1'-0"

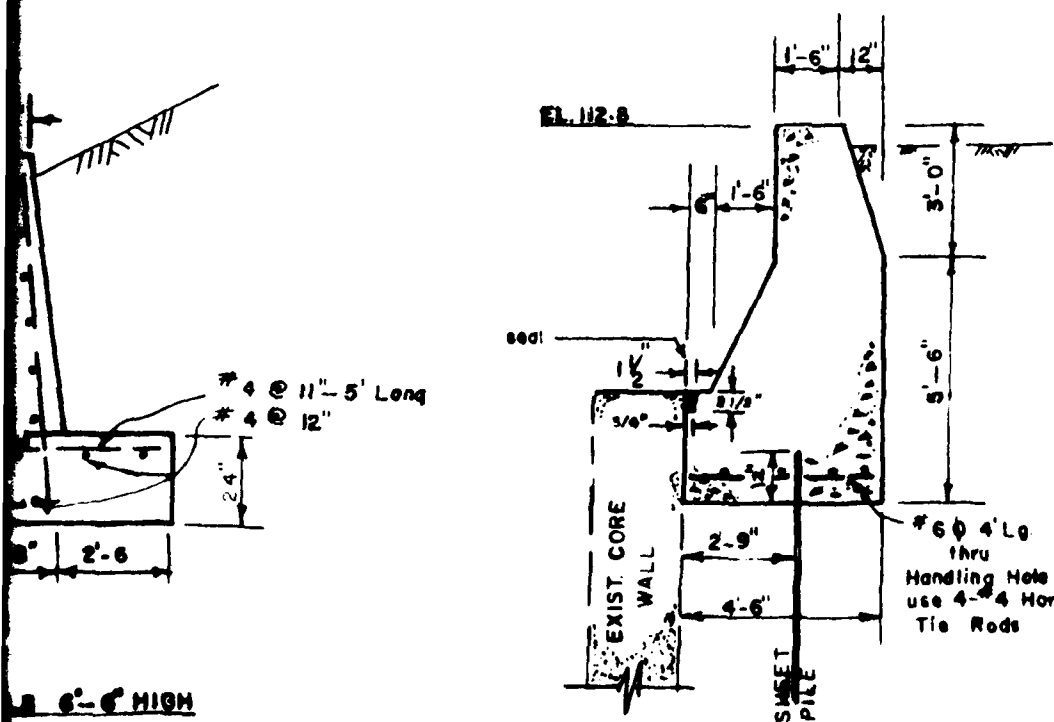
EL. 112.8

see

EXIST CORE

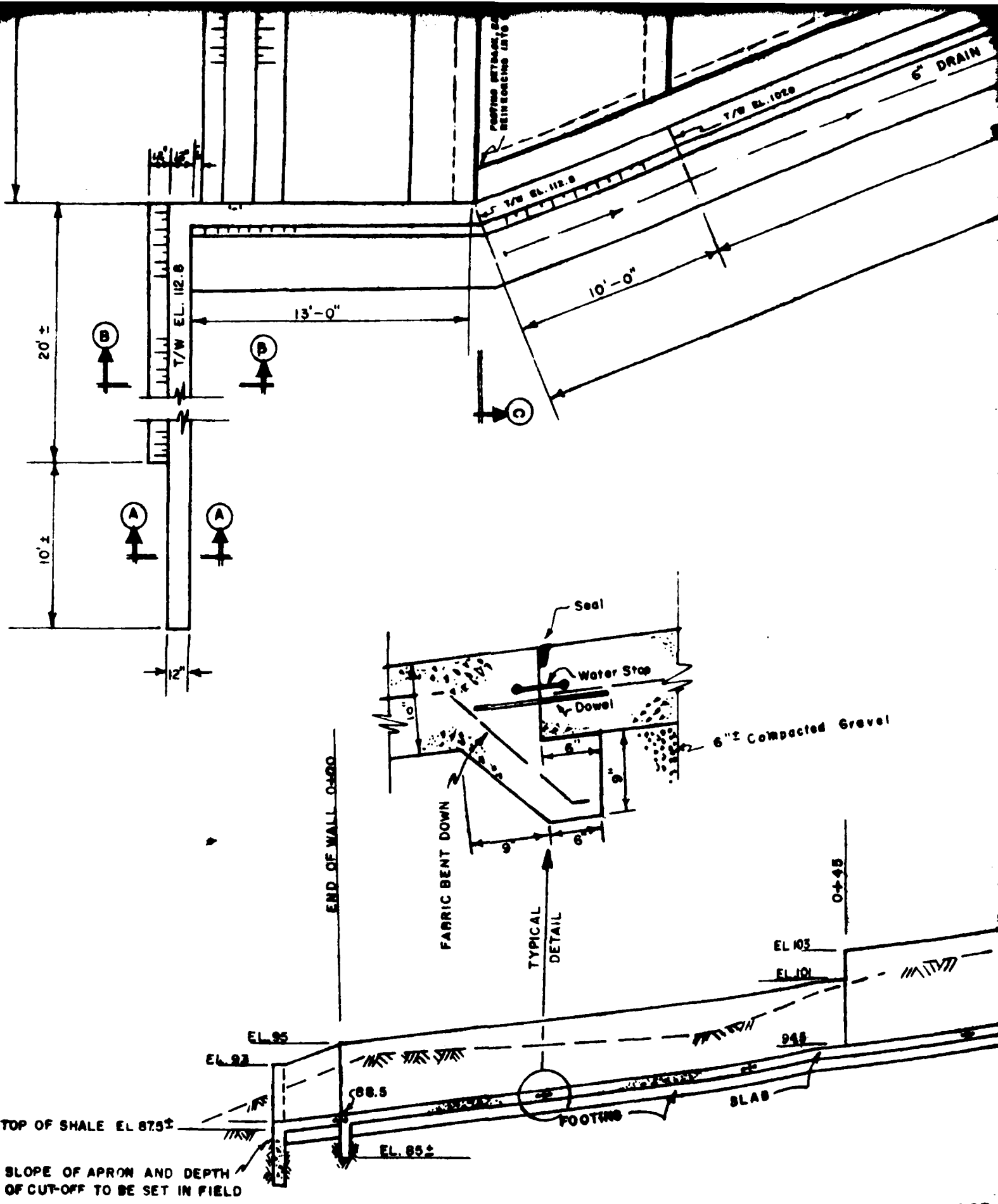


**SECTION F-F**  
Scale 1/4" = 1'-0"



**SECTION G-G**

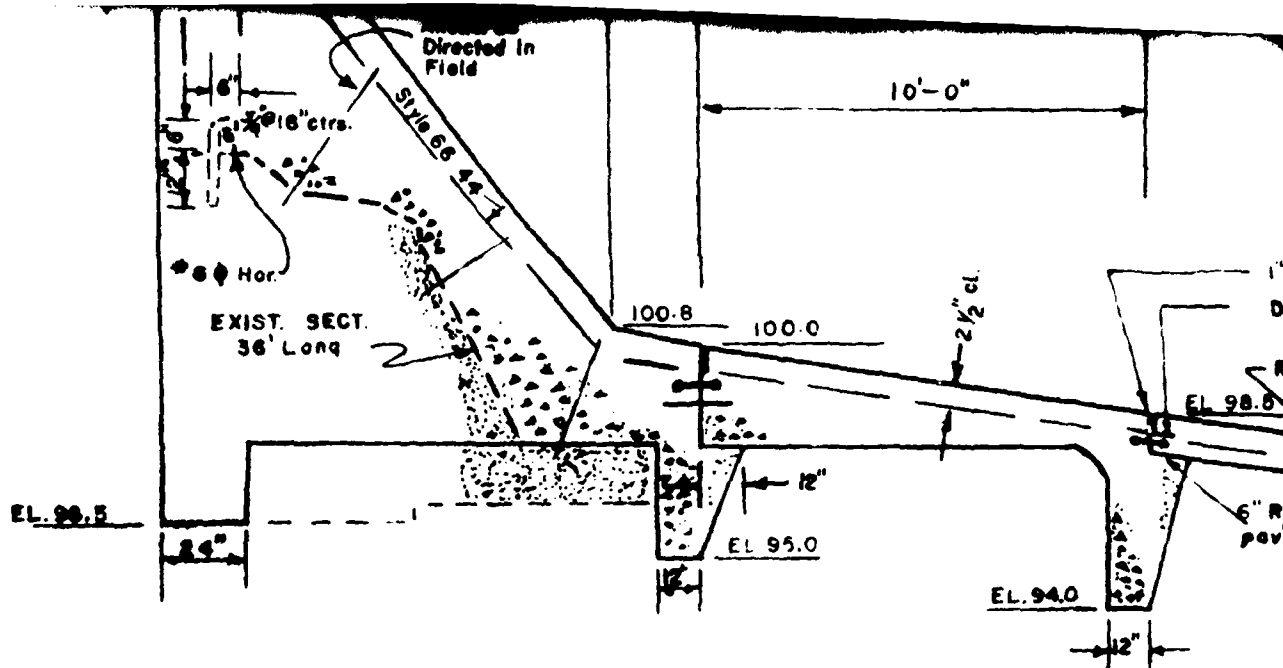




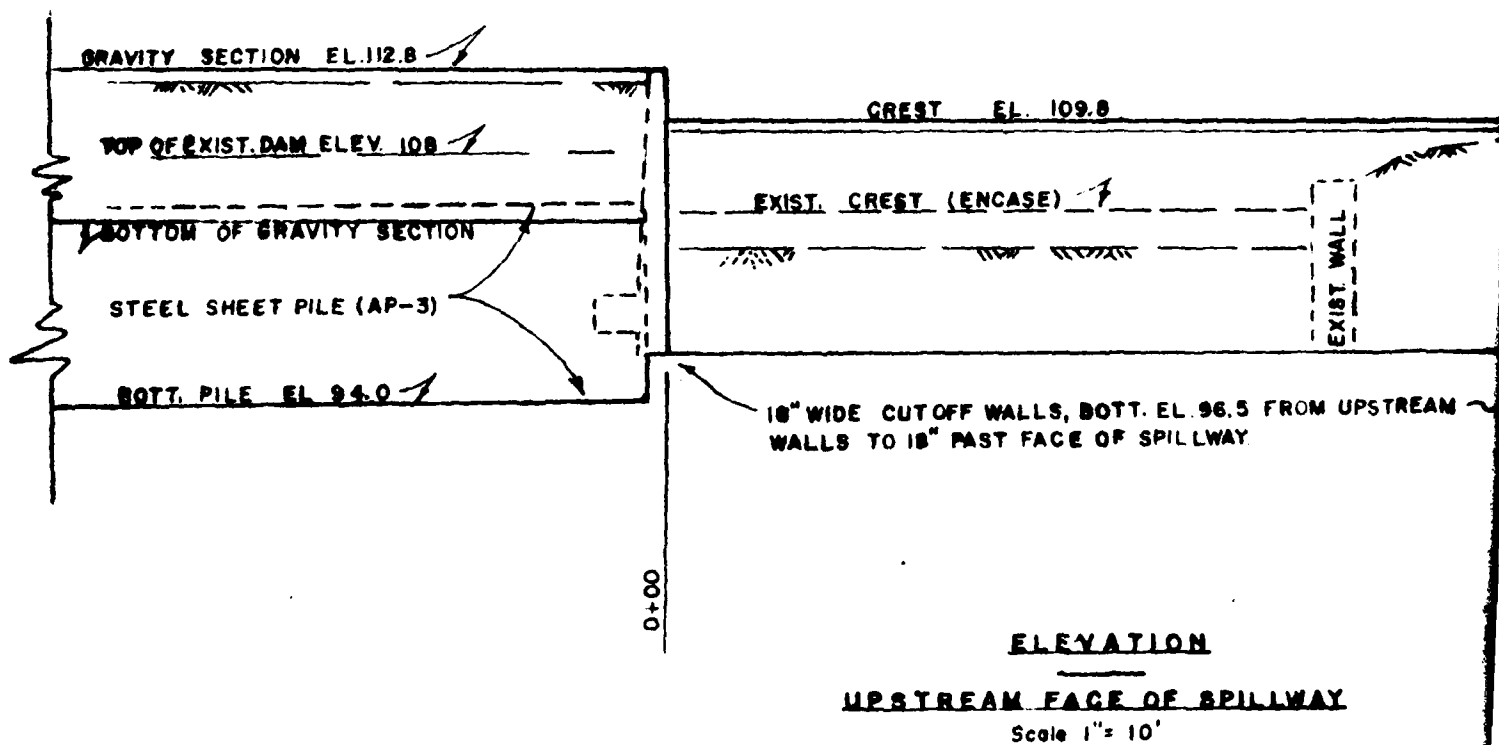
ELEVATION ALONG FACE

Scale

**Scale 1"=10'**



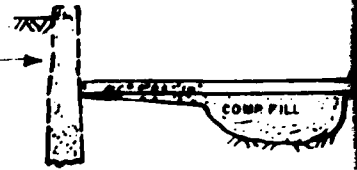
**SECTION E-E**  
Scale 1/4" = 1'-0"



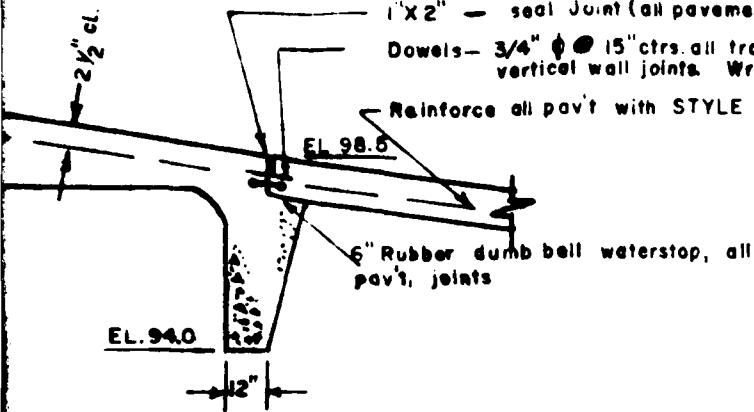
TOP OF STE

BOTTOM OF ST

See Note on Plan



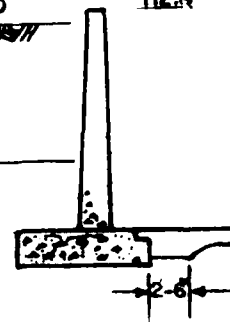
SECTION —  
Scale 1"=10'



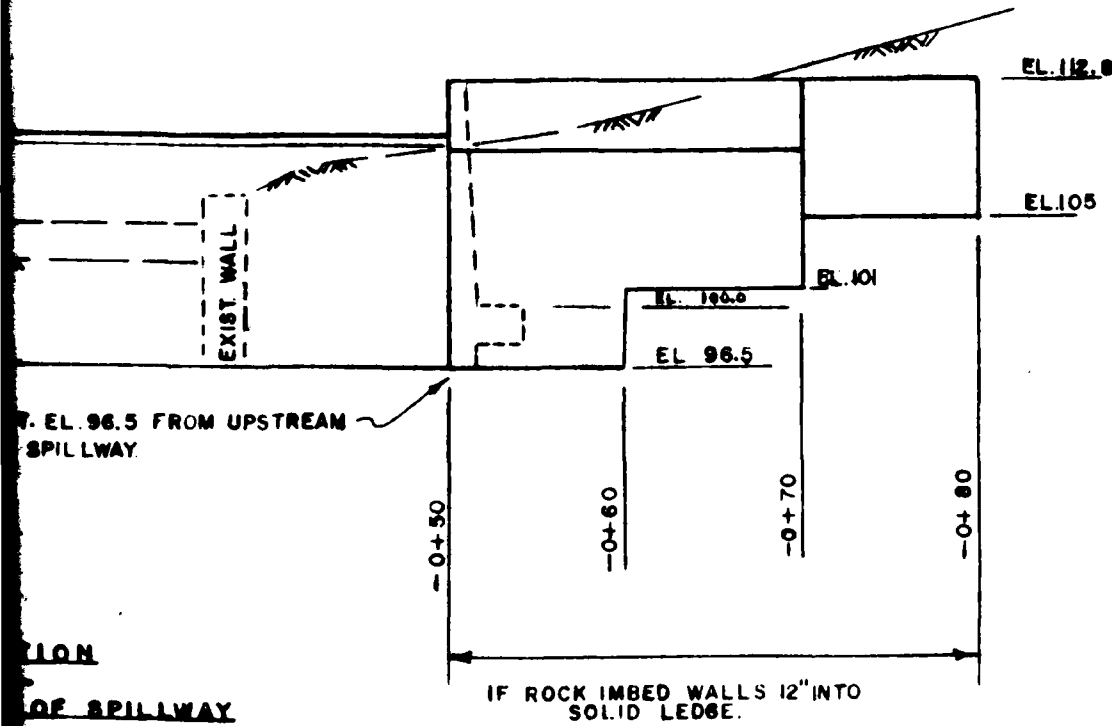
FIN. GR. EL. 112.0

112.0

EXIST. GR.



SECTION  
Scale 1"=10'



NOTE

CLEAN AND COAT  
NEW CONCRETE  
PRICE FOR CONCR

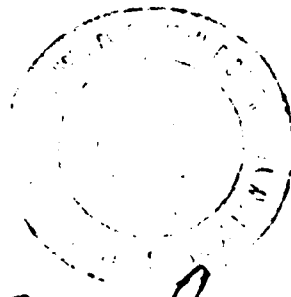
Contract

VILLAGE

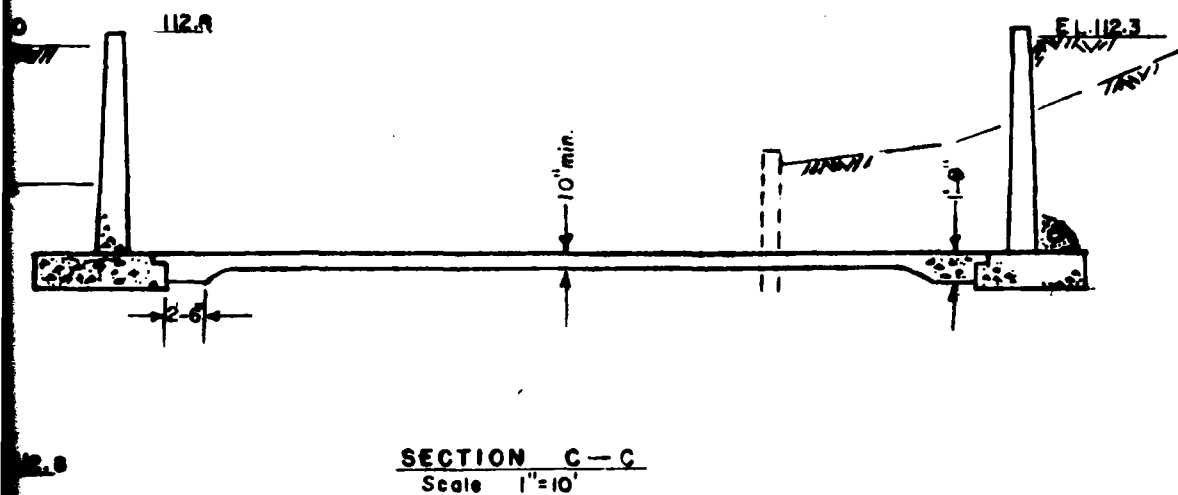
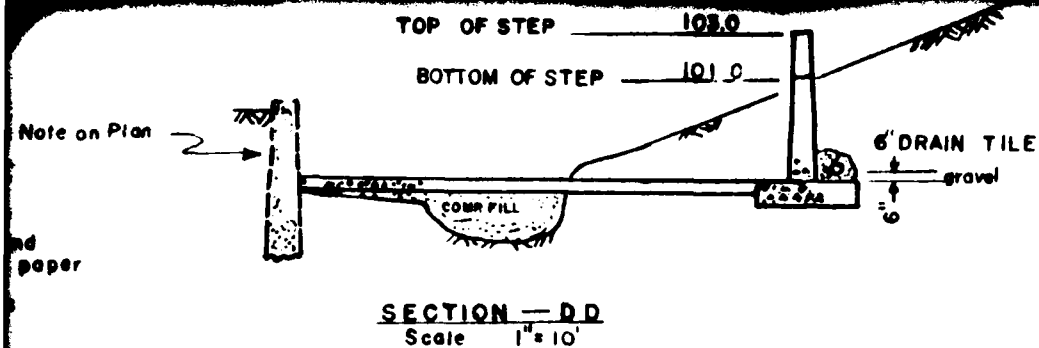
ALBANY CO.

RAISE MA

CON



*Robert J. L...*



NOTE

CLEAN AND COAT ALL CONTACT SURFACES BETWEEN OLD AND NEW CONCRETE WITH UPJO 703 BOND. Q.E. INCLUDE IN UNIT PRICE FOR CONCRETE.

Contract No 2

VILLAGE OF ALTAMONT

ALBANY CO.

NEW YORK

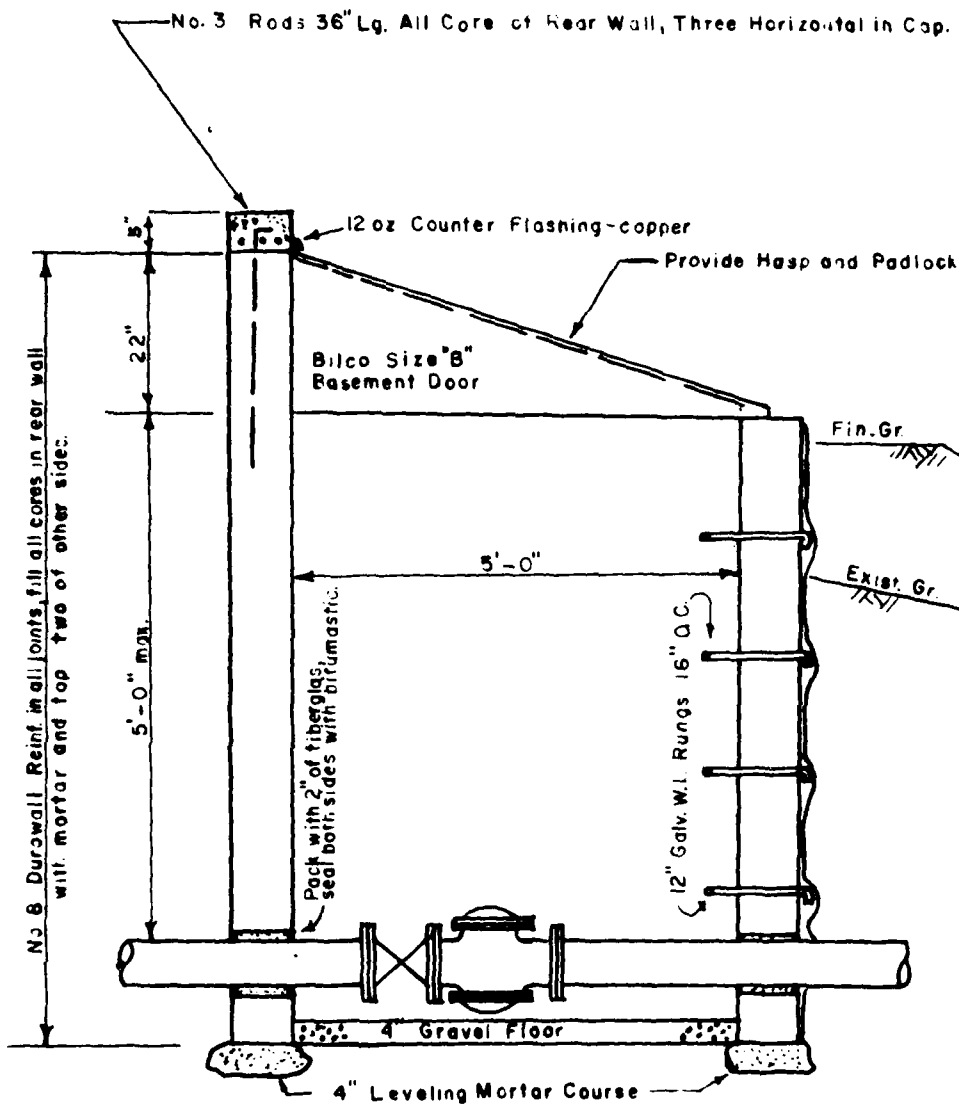
RAISE MAIN RESERVOIR 5 FT

CONCRETE DETAILS

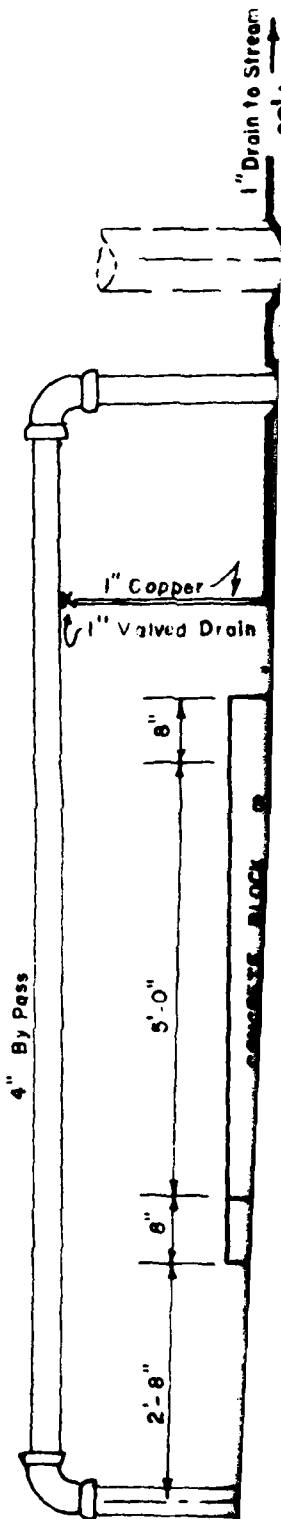
MARCH 1961

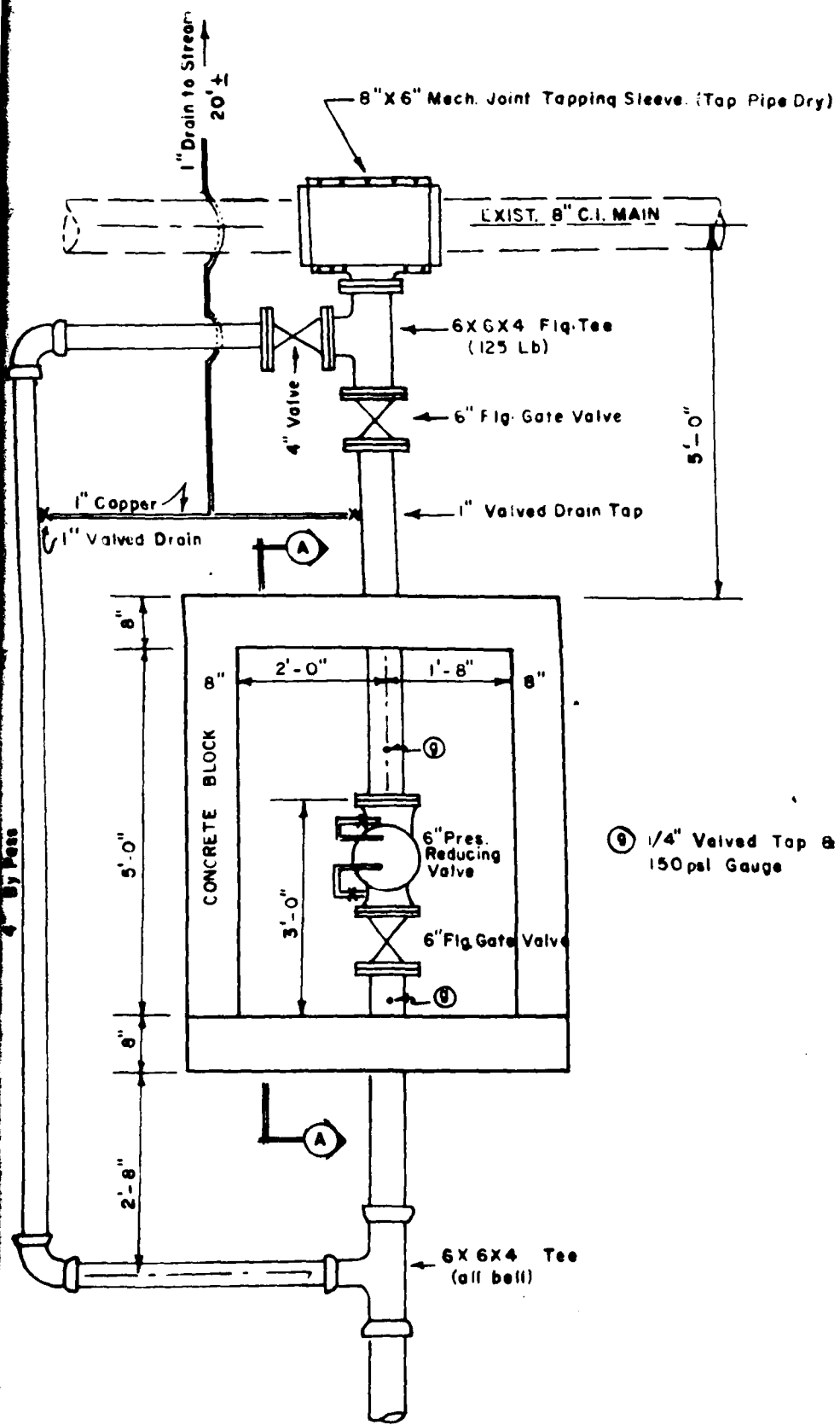
ROBERT J. GANLEY  
CONSULTING ENGINEER  
36 STATE STREET  
ALBANY, NEW YORK

3  
+  
3 sheets

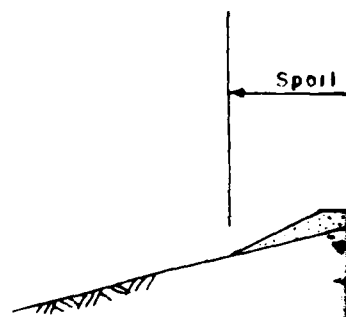


**SECTION A-A**



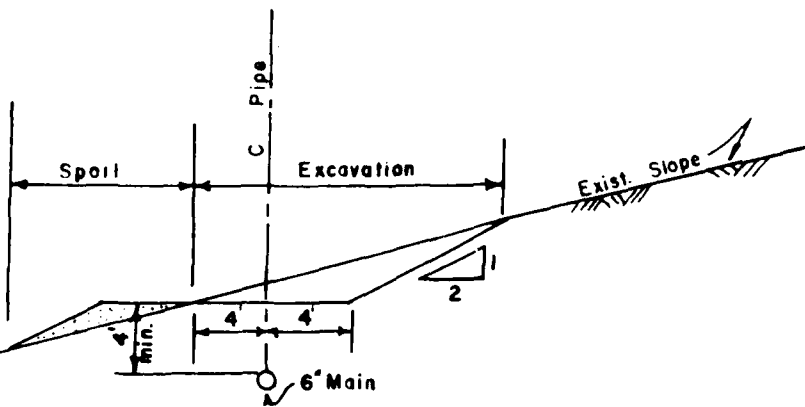


**PLAN**

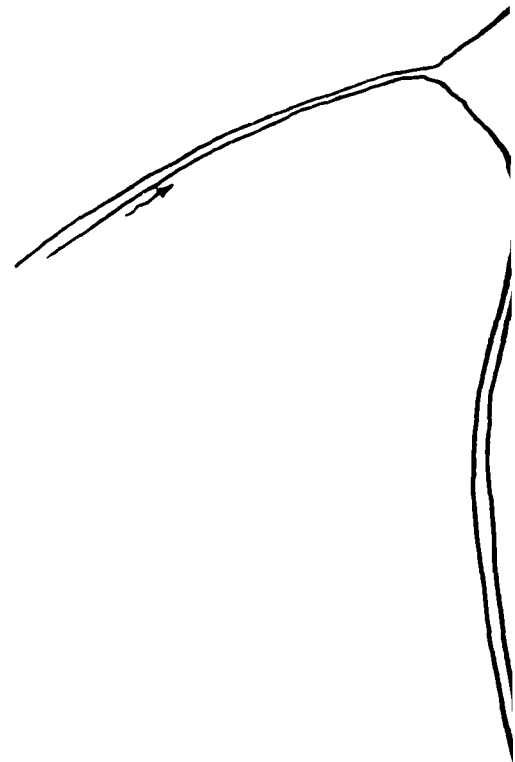


**BE**

13

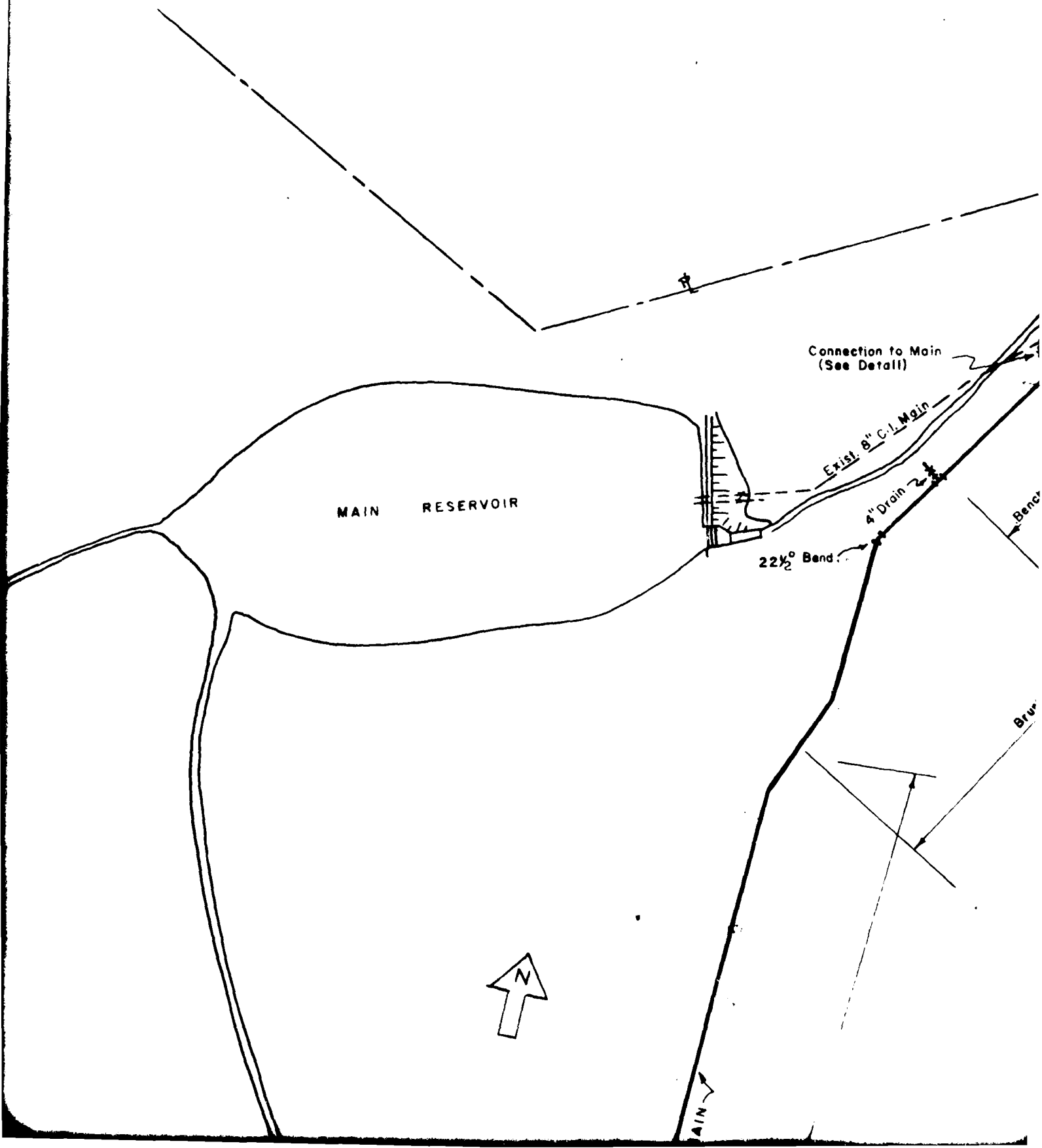


TYPICAL  
BENCHED SECTION





14



AD-A105 772

NEW YORK STATE DEPT OF ENVIRONMENTAL CONSERVATION ALBANY F/G 13/13  
NATIONAL DAM SAFETY PROGRAM. ALTAMONT MAIN RESERVOIR DAM (INVEN--ETC(U)  
AUG 81 G KOCH

DACW51-79-C-0001

NL

UNCLASSIFIED

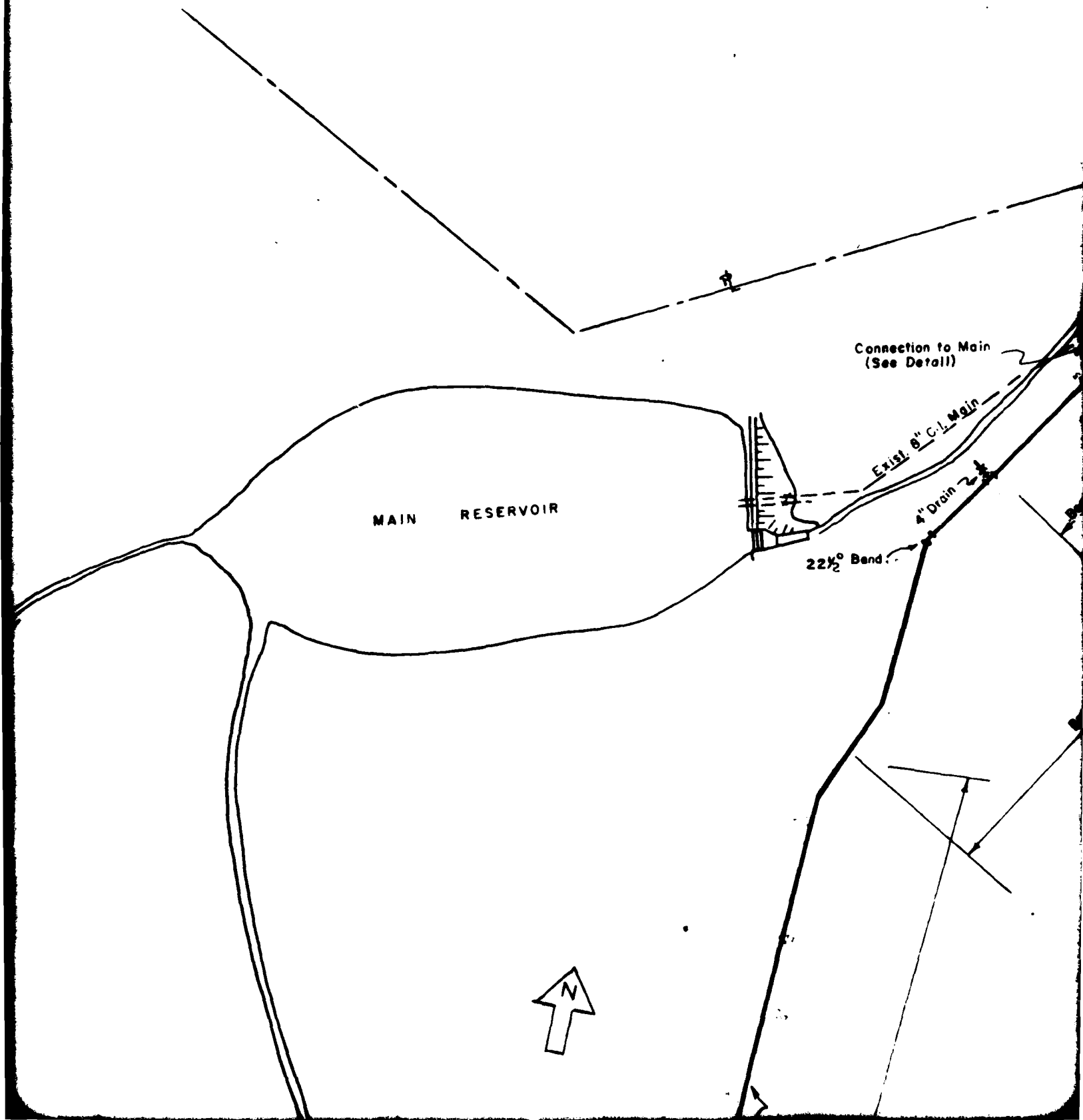
2 OF 2

AD A  
104 772

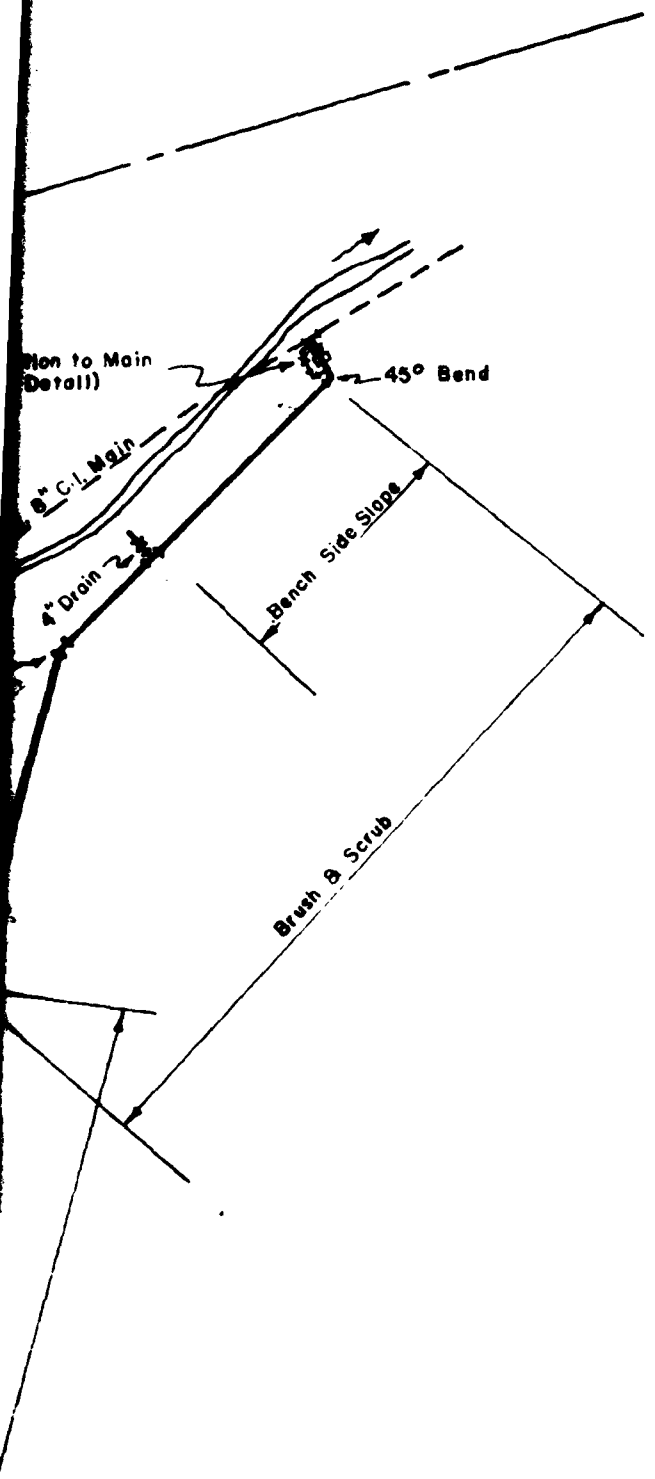


END  
DATE  
FILMED  
11-81  
DTIC

14

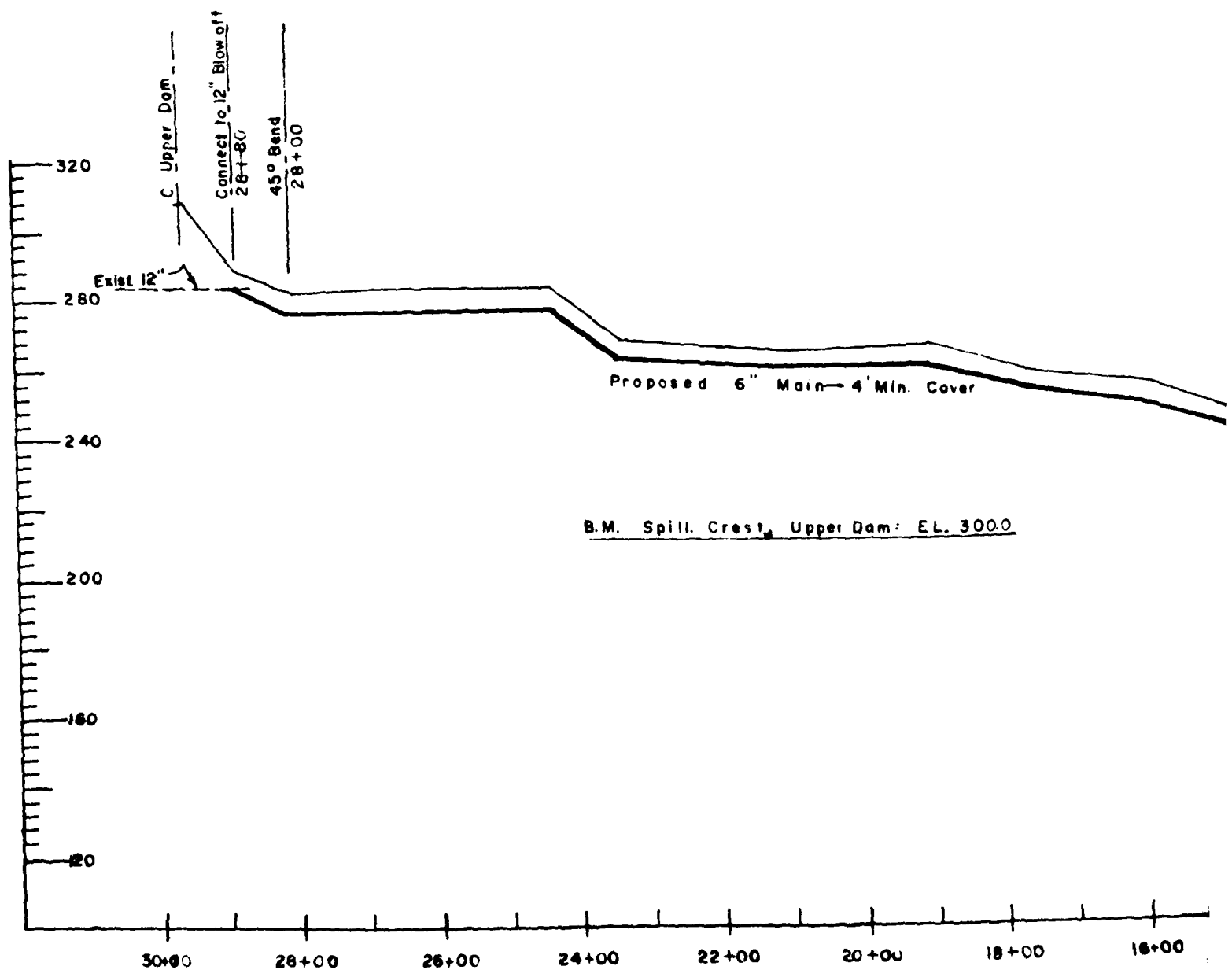


15



PRESSURE REDUCING VALVE CHAMBER  
&  
MAIN CONNECTION

SCALE  $\frac{1}{2}'' = 1' - 0''$



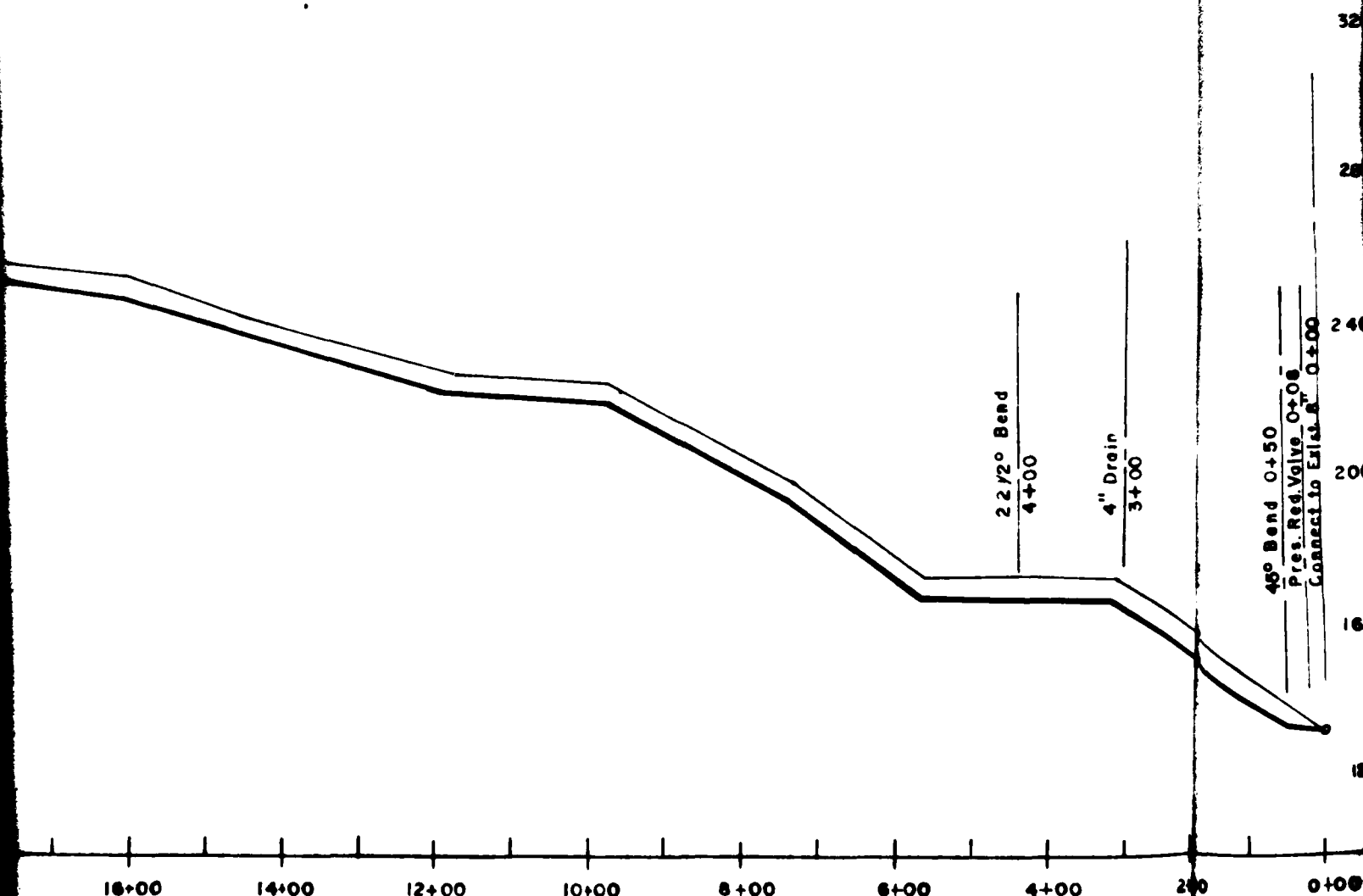
PIPE LINE PROFILE

SCALE:

$\frac{1}{2}'' = 20'$   
 $\frac{1}{4}'' = 40'$

E CHAMBER

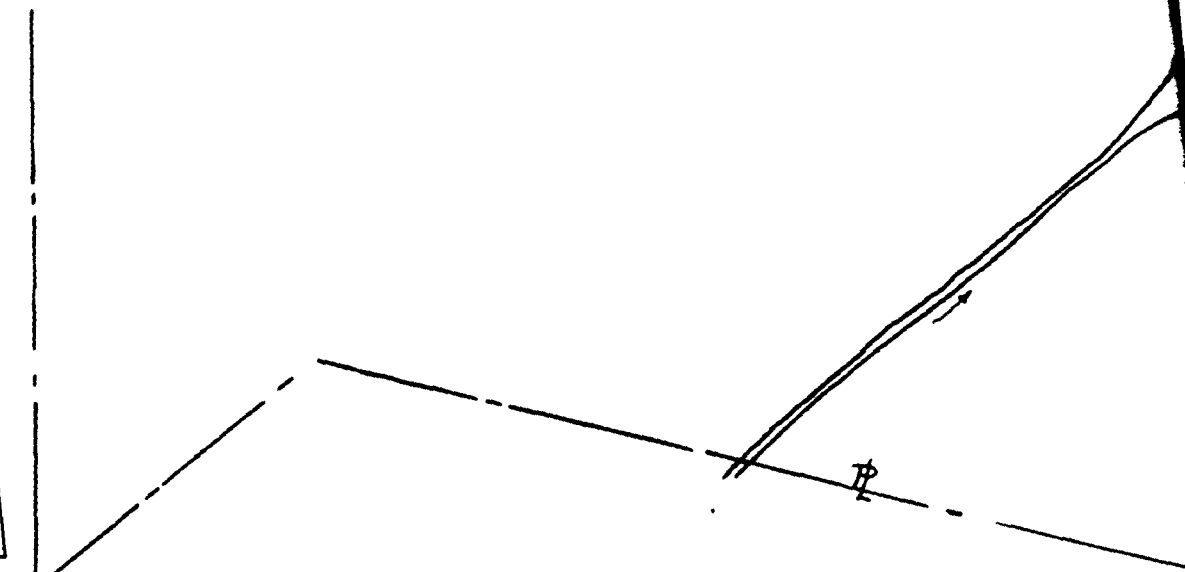
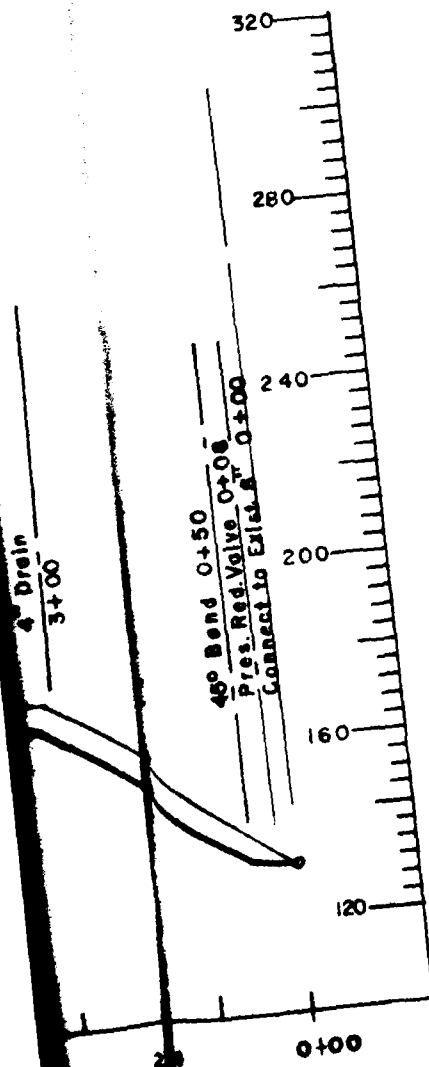
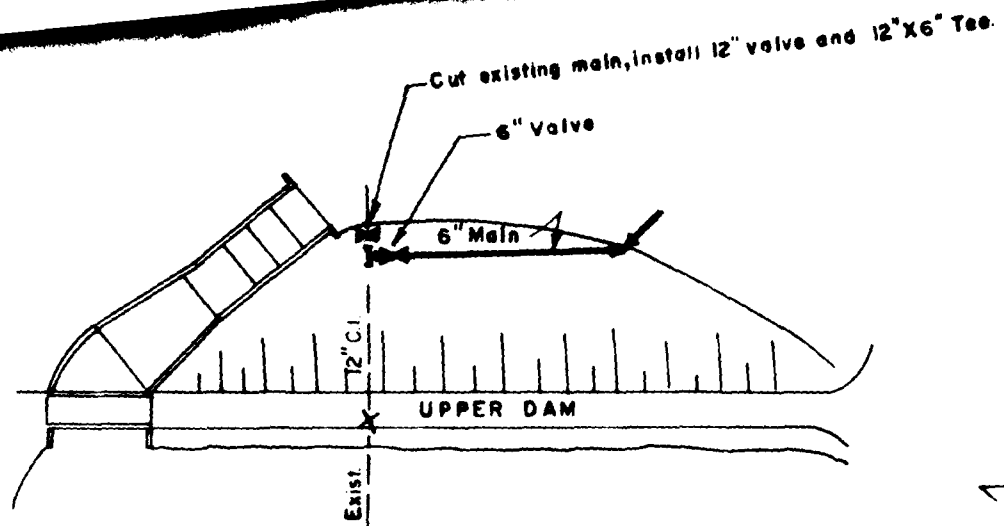
ION



THE PROFILE

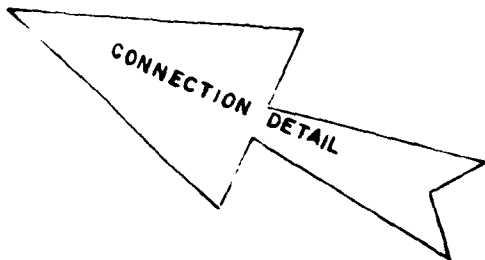
1" = 200' HORIZONTAL  
1" = 40' VERTICAL

17



6

12" X 6" Tee.



CONNECTION  
DETAIL

UPPER RESERVOIR

Bench  
Side Slope

Brush and Scrub

PRO

Along Woods Road and

TO KN

GENERAL PLAN

SCALE 1" = 200'

VILLAGE OF

ALBANY CO.

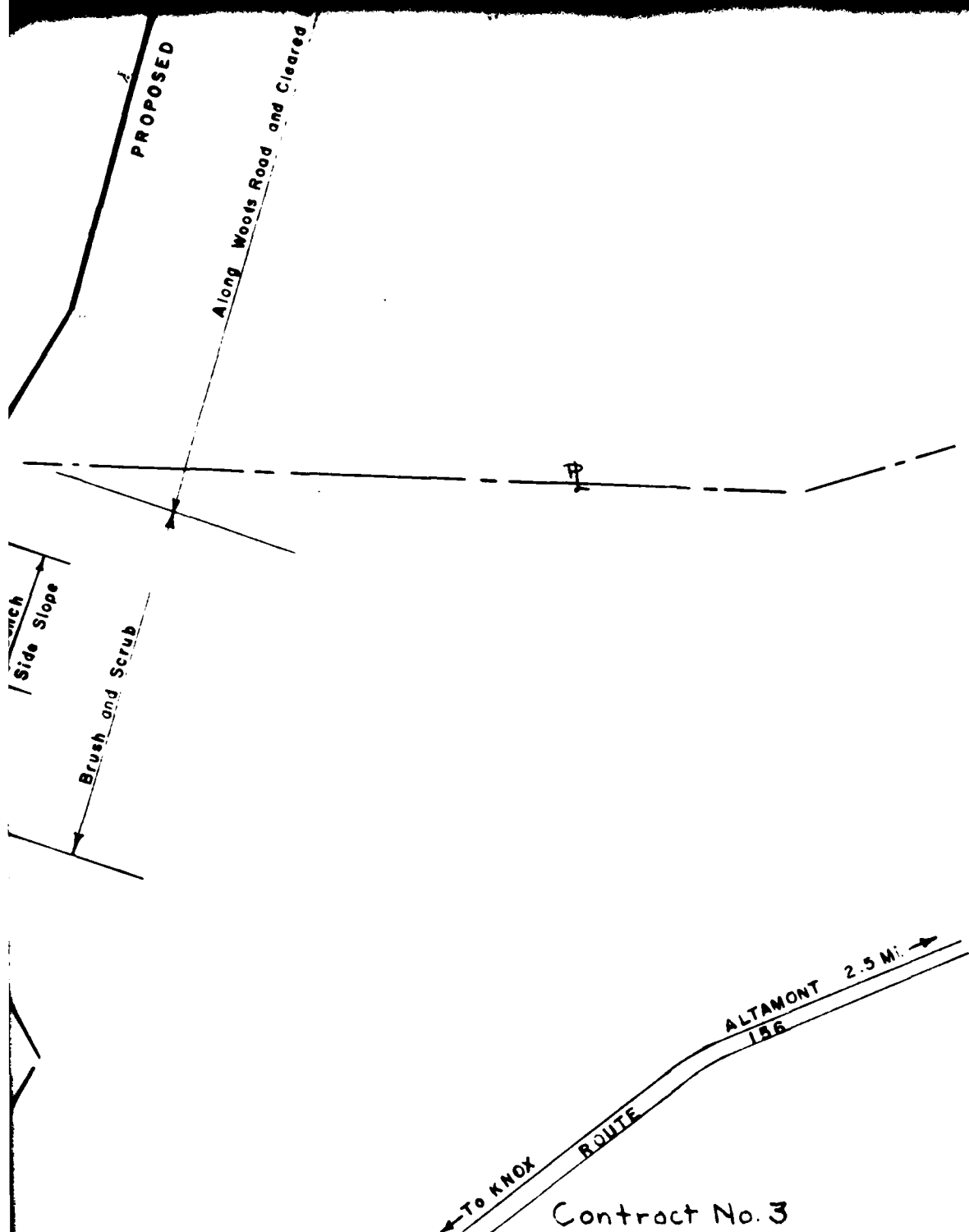
TRANSMISSION

APRIL

ROBERT  
CONSULTING  
36 STATE ST.  
ALBANY

*Robert J. Gentry*





# VILLAGE OF ALTAMONT

ALBANY CO.

NEW YORK

## TRANSMISSION MAIN EXTENSION

APRIL 1961

ROBERT J. GANLEY  
CONSULTING ENGINEER  
36 STATE STREET  
ALBANY NEW YORK

1  
of